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Dr. Lounsbury received his B.S. and M.S. degrees from the University of Illinois and the Ph.D. degree from Northwestern University. In 1961, he became the Chairman of the Geography Department and Coordinator of Special Instructional Programs at Eastern Michigan University. Previously he was Chairman of the Earth Sciences Department at Antioch College. At various times he has been visiting professor at the University of Georgia and Wesleyan University and Lecturer in the Miami University Extension Program.

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Miss Smith, who has long been identified with geography instruction in the Cleveland Public Schools, is retired and teaching part-time at Fenn College, Cleveland. In 1959, she selected the pictures and prepared the teachers' guide to accompany the filmstrip, "Cleveland's Industrial Valley." This material has been distributed to every elementary school in Cleveland and Cuyahoga County.

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Dr. Ives is a staff member at the Stanford Aerosol Laboratory, a part of the Department of Chemistry and Chemical Engineering, Stanford University. His work is largely instrumentation for operation in and evaluation of difficult environments. Dr. Ives has written on a greater variety of phases of geography and has more articles published than any living geographer.

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Dr. Thompson, Associate Professor and Acting Chairman of the Geography Department, has taught geography at Miami University for twelve years. He is the co-author of the publication *Ohio Population—Growth and Distribution*, published by the Department of Industrial and Economic Development, State of Ohio, October, 1960.

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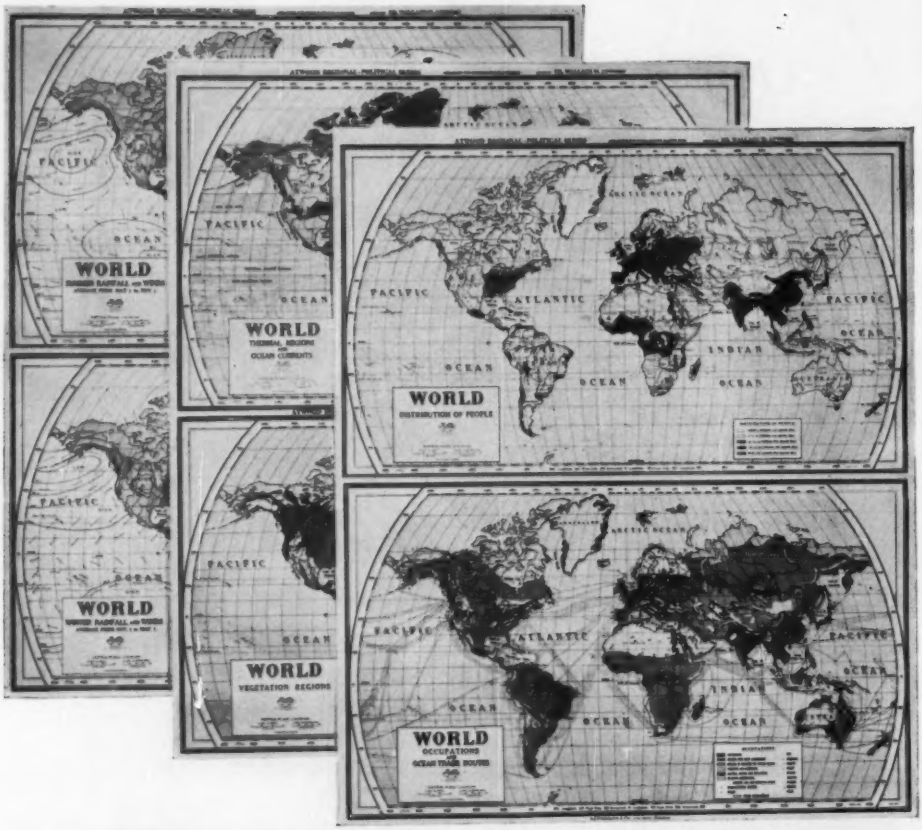

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INDUSTRIAL DEVELOPMENT IN THE OHIO VALLEY

JOHN F. LOUNSBURY
Eastern Michigan University

THE OHIO RIVER VALLEY has long been an important factor in the settlement and economic development of central United States. At an early date industry developed along the river and its navigable tributaries, utilizing the coal, water, and other local resources. The iron and steel industry of the Pittsburgh area, the concentrations of potteries in and around East Liverpool, Ohio, and the industrial complexes in Cincinnati, Louisville, and other areas have long been important industrial centers. During the last fifteen years, however, the economic geography of the valley has been reassessed by the American industrialist in terms of modern industrial demands. The result has been a spectacular investment and subsequent industrial growth probably not equalled in any other area of comparable size in the world.

Since World War II, well over 2,500 industrial plants have located in the valley. The 72 counties bordering the navigable river system, plus the greater Pittsburgh area, represent less than 1 per cent of the nation's land area and about 4 per cent of its population. During the 1950-1959 period, however, approximately $15 billion dollars have been invested in industrial developments which represents about 7 per cent of the nation's total investment in new industry and public utilities.[1]

The Market Factor

There are many reasons for this present growth in industry. Many types of industries are attracted to the valley because of its location in respect to the major market of the world (Fig. 1). The population concentrations from the eastern seaboard to the southern end of Lake Michigan consume more goods and have a greater potential purchasing power than any similar area in size in the world. This huge market is within 500 miles of the center of the valley, and most river locations are adequately connected by rail or roads to the major consuming sub-districts. The factor of material flow, which is concerned with the assembling of raw materials and the shipment of finished products to market, is a most important consideration in any industrial operation. In this respect, the Ohio River's connection via the Mississippi waterway to the Gulf and Atlantic is highly significant. The shipment of basic raw materials by low cost water transporta-

[1] A. S. Chamberlain, "The Role of the Ohio River in the Development of Ohio Valley Industry," OVIA-AWO Seminar, June 13, 1960.

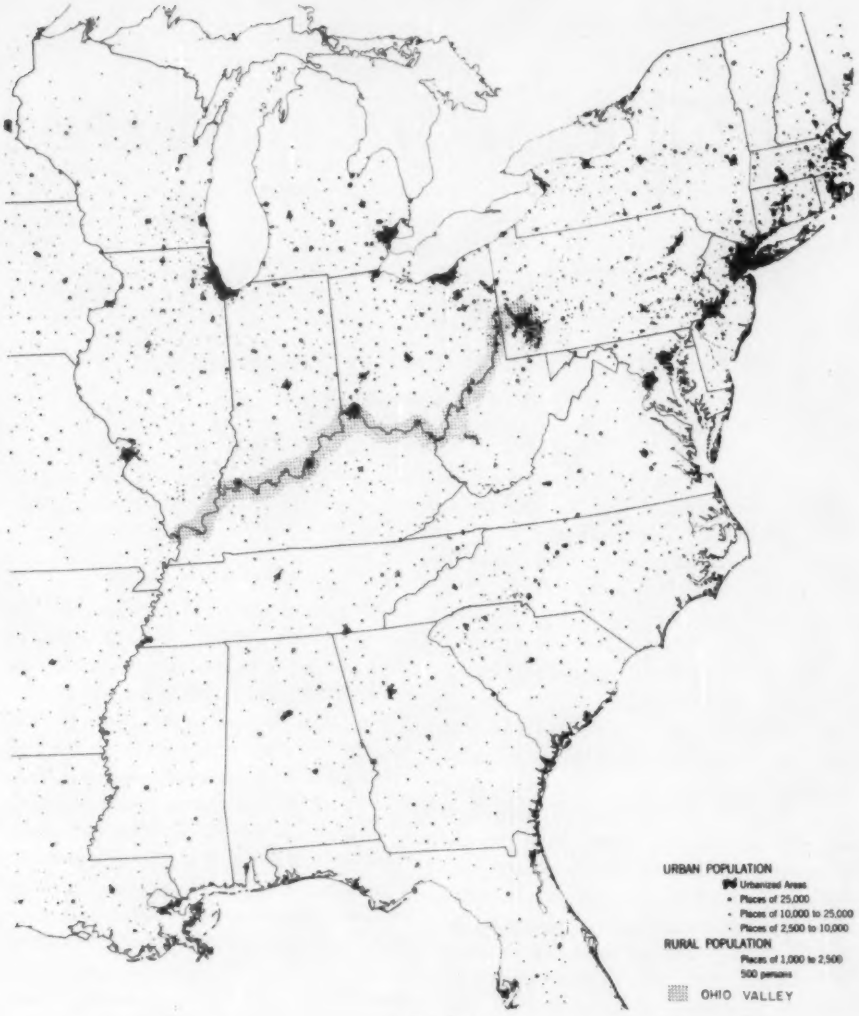

FIG. 1

tion to the doorstep of the world's most important market cannot be over emphasized.

Mineral Resources

The six states bordering the Ohio River produce about 87 per cent of the nation's bituminous coal (Fig. 2). It is estimated that these states have coal reserves that will last for several hundreds of years at the present rate of consumption. The greater part of this important resource lies adjacent to the river or its navigable tributaries. Recent advances in mechanization and barging have provided valley locations with a virtually limitless supply of low cost coal.

Another major mineral resource is the extensive deposit of rock salt underlying the West Virginia sector of the valley. This vast deposit may prove to be of

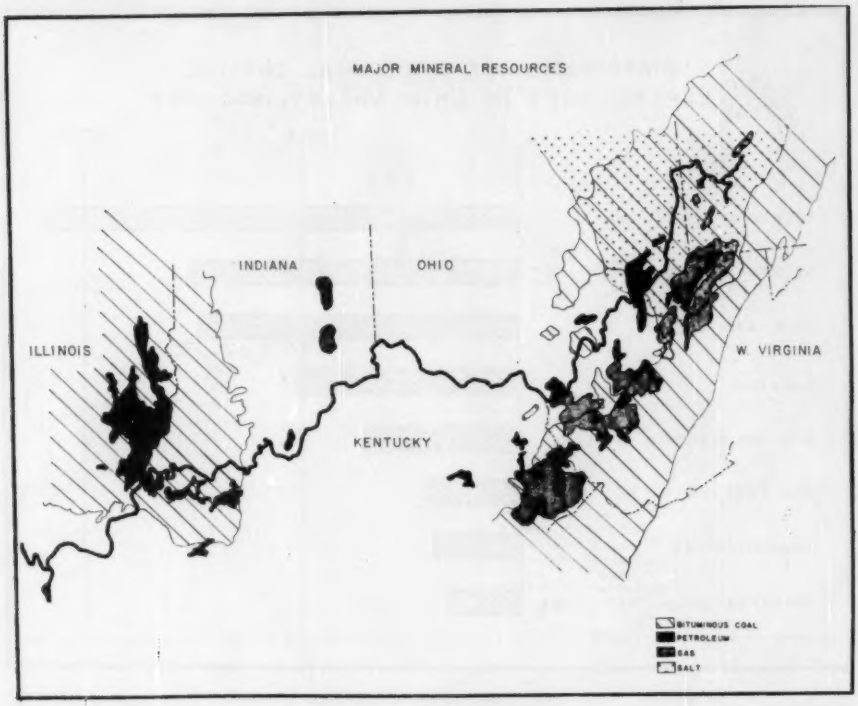

FIG. 2

great importance in the future industrial development. In addition, within economic distances of the river, significant sources of gas, petroleum, and limestone are presently exploited.

The Ohio River system provides an abundant supply of process and condenser water required in great amounts by many types of industry. A ton of steel requires 65,000 gallons of water; refining a barrel of oil requires about 570 gallons, and most of the chemical industries as well as modern electrical generating plants are prodigious consumers of water. One of the new generating plants on the Ohio River consumes about 1.5 billion gallons per day which is considerably more than the daily consumption of New York City. In addition to the surface or river water, vast reservoirs of underground supplies exist in glacial or alluvial sands and gravels. Ground water is highly important to industries requiring cooler or better quality water in their manufacturing processes than surface water can normally provide.

The geographical position of the valley between the population centers to the north and the major sources of natural gas to the south has resulted in several of the country's largest pipelines crossing the valley. In most parts of the valley, these pipelines provide adequate supplies of natural gas which may be important locally as a factor of industrial location.

Industrial Growth

It is obvious that each major type of industry has its own specific requirements, and an optimum location for one category of industry may not be adequate for other types of manufacturing plants.

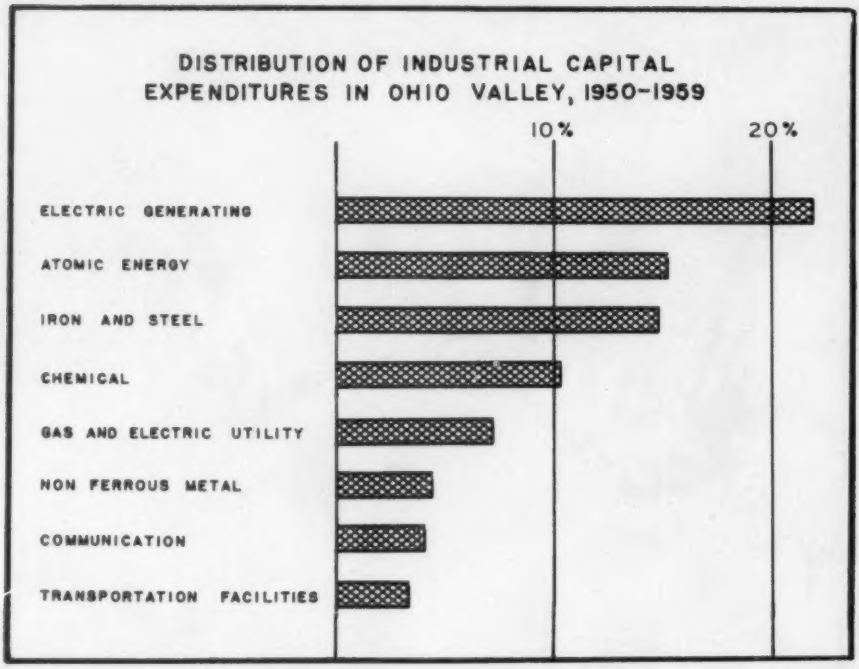

FIG. 3. (Source of data: Ohio Valley Improvement Association, "Actual and Announced Expenditures Since 1950 For New and Modernized Plant Facilities in Counties Bordering the Ohio River and Its Navigable Tributaries," December, 1959.)

The economic geography of the Ohio Valley has been most attractive to industries requiring low cost power.

Since 1950, the greatest part of the capital expenditures invested in new industry has been allocated to power-oriented plants. Over 22 per cent of these investments have been utilized for the construction of electric generating plants; atomic energy operations and iron and steel expansion have each accounted for more than 15 per cent, over 10 per cent for new chemical industries, and about 4 per cent for aluminum reduction facilities (Fig. 3).

Electrial Power

During the last few years, three major atomic installations have been constructed in the valley. A large uranium ore-processing plant has been built just north of Cincinnati, and two huge gaseous-diffusion plants have been established in Paducah, Kentucky, and Portsmouth, Ohio (Fig. 4). These plants are key installations in the nation's over-all atomic energy program. The low cost of electrical power has been most influential in locating these plants in the valley. Together they consume almost one-tenth of the total electrical energy used in the nation.[2] To serve the atomic plants and other industries in the valley as well, over 30 major electric generating stations have been established. The growth of electrical power along the valley has been phenomenal (Fig. 5). During the 1939 to 1958 period, there has been an 816 per cent increase in electricity generated in plants along the river and its navigable

[2] Industrial Development, "The Ohio River Valley," July, 1959.

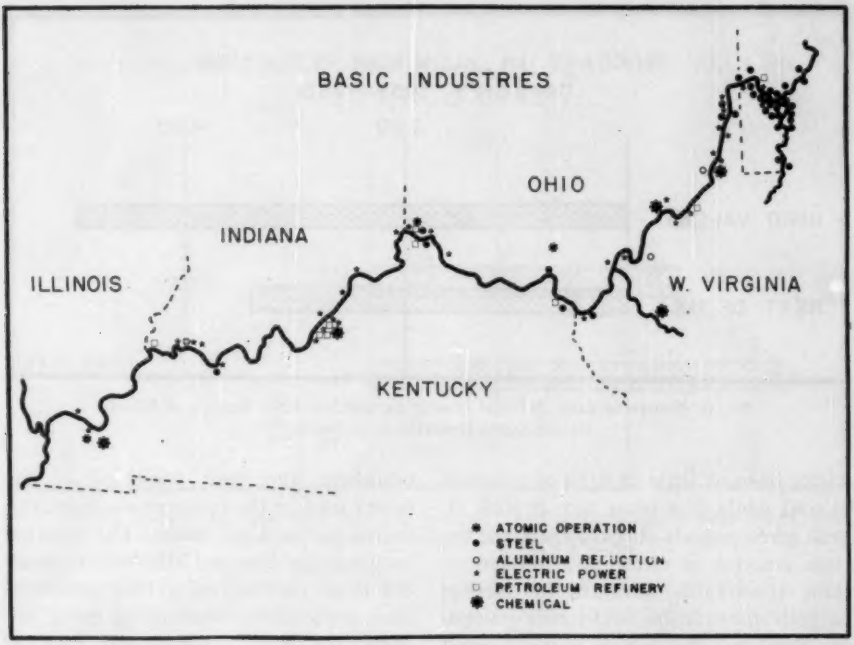

FIG. 4

tributaries compared to a 331 per cent increase for the country as a whole. The growth of generating capacity has been 538 per cent compared to a 221 per cent nationwide increase. Cost of transporting coal by Ohio River barges is now approximately 4 mills per ton mile in contrast to over 11 mills by rail.[3] Remarkable improvements in the use of coal in steam generating plants has made it possible to produce a kilowatt hour of elec-

[3] Joseph R. Hartley, "The Economic Effects of Ohio River Navigation," School of Business, Indiana University, Bloomington, Indiana, 1959.

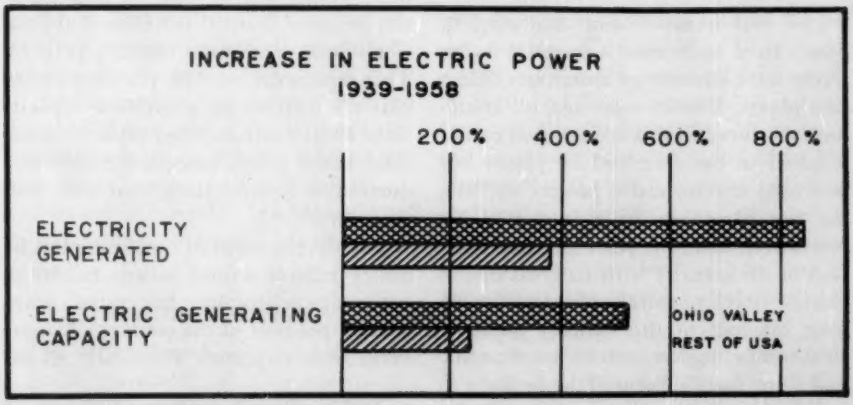

FIG. 5. (After C. F. Barloon. "Statement Before Senate Select Committee on National Water Resources on the Importance of the Ohio River Improvement Program, February, 1960.")

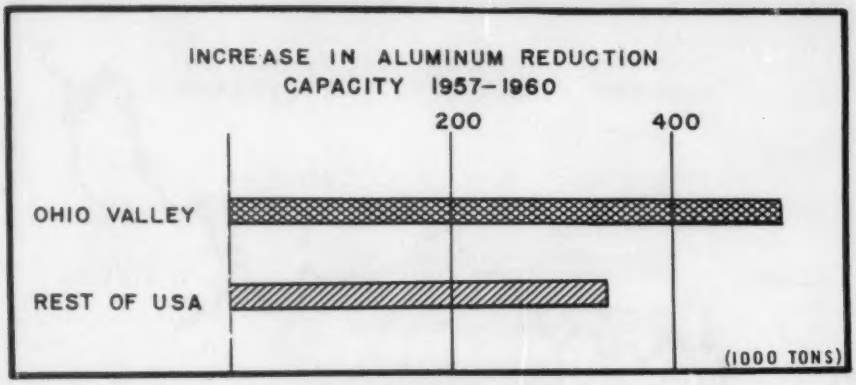

FIG. 6. (Source of data: *Mineral Market Survey No. 3092.* Bureau of Mines. United States Department of Interior.)

tricity from as little as 6/10 of a pound of coal while fifty years ago, it took almost seven pounds of coal to produce the same amount of electricity. In view of these remarkable advances in mining, barge transportation, and steam generating facilities, the cost of coal-generated power on the Ohio is now about 2 mills per kilowatt hour as compared to over 3 mills for the nation as a whole. Plants on the main stream of the Ohio generate over 10 per cent of the nation's power today as compared to less than 4 per cent twenty years ago.

The Aluminum Industry

Low cost transportation and efficient power have been most influential in the recent establishment of aluminum reduction plants. Twenty years ago, all aluminum produced in this country was manufactured in the east, and all plants but one used hydro-electric power. In 1940, the first plant, was built in the Pacific Northwest, and four years later, that section of the country with its great hydro-electric developments was producing almost one-half of the nation's total. In 1950, competing demands for water power and rising costs influenced the industry to search for another source of power. By 1955, the use of natural gas was well established, and over one-third of the power used in the industry was from this source in the Gulf States. The demand for gas in the East and Mid-West committed large reserves for a long period of time and, along with rising rates, enabled the newly rejuvenated coal industry to successfully compete in producing power for the industrial market. Previous to 1956, there were no reduction plants in the valley. Presently, there are three large plants in operation or under construction in Ravenswood, West Virginia, Evansville, Indiana, and Clarington, Ohio. The combined capacity of these plants will be 500,000 tons annually or more than 19 per cent of the nation's total aluminum capacity (Fig. 6). This represents over 60 per cent of the nation's increase in aluminum capacity since 1956. The combined capacity of the three valley plants exceeds the 1959 production of France, Italy, East and West Germany.[4]

The development of the aluminum industry reflects several salient factors of economic geography. In recent years, over 85 per cent of the country's bauxite needs were imported. Practically all the

[4] Mineral Industry Surveys, "Aluminum in 1959," MMS No. 3092, Bureau of Mines, U. S. Dept. of Interior.

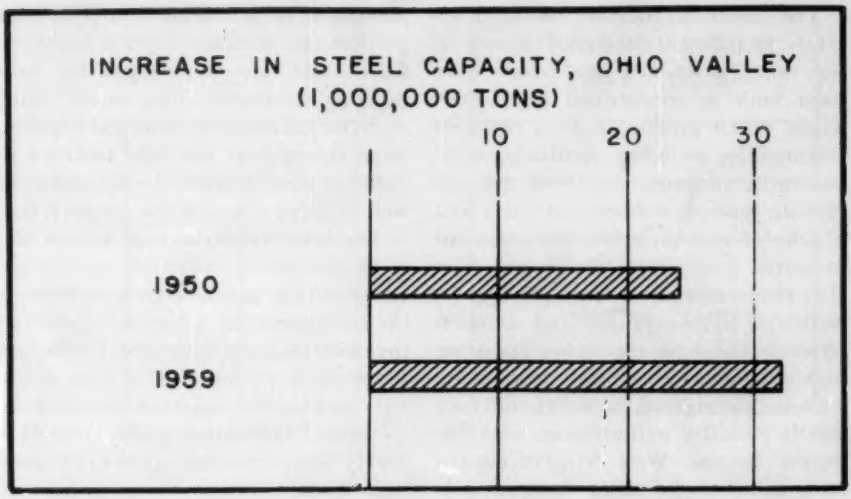

FIG. 7. (Source of data: American Iron and Steel Institute, "Annual Capacities of Coke Ovens, Blast Furnaces, and Steel Furnaces, 1950 and 1959.")

imports came from Jamaica, Surinam, and other areas in the Caribbean. The bauxite is shipped to alumina plants along the Gulf or Mississippi River where it is reduced to extract alumina. About two tons of bauxite are necessary to produce one ton of alumina. Approximately two tons of alumina and one-half ton of petroleum coke are required to produce one ton of primary aluminum. In addition, over 9 kilowatt hours of electrical power are needed to refine one pound of aluminum. In view of the tremendous power needs of the aluminum industry, the sources of bauxite, location of the alumina extract plants, and the fact that 75 per cent of the nation's aluminum market is within 500 miles of the Ohio River plants, it is not difficult to understand the recent developments of the aluminum industry in the Ohio Valley.

Other Basic Industries

The upper Ohio Valley has long been a major producer of iron and steel. Abundant supplies of coal and process water, along with its accessibility to the Great Lakes shipments of iron ore, have provided the upper valley with superior advantages. In 1950, the thirty plants on or near the river possessed a steel capacity of approximately 24 million tons. In the following nine years, over three-fourths of these plants experienced major expansions and three new plants were established representing an over-all increase in capacity of approximately 32 per cent (Fig. 7). In 1959, these plants had a combined capacity of 31½ million tons or more than 21 per cent of the nation's total. This capacity is approximately equal to the combined production of West and East Germany.[5] If all the iron and steel plants within 50 miles of the river were considered, including the Youngstown-Warren, Canton, Middletown, Ohio, complexes and the Johnstown and Latrobe, Pennsylvania plants, the combined capacity would be over 35 per cent of the nation's steel potential.

[5] Sources of data: Mineral Industry Surveys, "Iron and Steel in 1959," MMS No. 3120, Bureau of Mines, U. S. Dept. of Interior, and American Iron and Steel Institute, "Annual Capacities of Coke Ovens, Blast Furnaces, and Steel Furnaces," 1950 and 1959.

The chemical industry as been recently established in several sectors of the valley. Over 130 new plants have been built or modernized since 1950. These plants produce a great range of commodities including fertilizers, acids, ammonia, silicones, acetylene, calcium carbide, synthetic rubbers and fibers, and plastics of various kinds. The chemical industries producing chlorine and chlorine products such as vinyl plastics, insecticides, and isocyanates and titanium tetrachloride find the valley locations highly advantageous. Brine deposits are scattered throughout the valley, and rock salt is virtually unlimited at workable depths in the West Virginia-Eastern Ohio sector of the valley. Current mining operations have been insignificant compared to the potential reserves. Other resources used by the chemical industries, and found in abundant quantities in the valley, include petroleum, natural gas, coal, electric power, and process water. Other raw materials not found in the valley may be shipped in via low cost water transportation.

Major complexes of interdependent and integrated plants have been established at Calvert City, Kentucky; New Martinsville-Moundsville, West Virginia; Parkersburg, West Virginia—Marietta, Ohio; Charleston, West Virginia; Louisville, Kentucky; and New Albany, Indiana. Less spectacular developments have been experienced in Cincinnati, Ashland, Kentucky, and other areas. The combined investment in chemical plants along the river now surpasses that of the Rhine, long referred to as the "Chemical Valley" of Europe.

Petroleum refining is another basic industry of the valley that has undergone recent expansion. Transportation costs from the geographically remote major petroleum sources to the population concentrations and consuming markets are of primary concern to the industry. The movement of petroleum and petroleum products on the Ohio River is highly efficient and directly competitive with pipeline movement. This factor, along with market considerations, has attracted large investments for new facilities in Ashland and Louisville, Kentucky, as well as other parts of the upper valley.

The basic industries such as iron and steel, aluminum, chemicals, petroleum, and electrical generating plants serve as the foundation for a complex industrial pyramid of integrating and fabricating plants of many types. The basic industries provide the materials for the more specialized fabricating plants creating a highly interdependent industrial complex. The Ohio River Valley, today, may be considered as one of the most important and diversified industrial regions of the world.

Industrial Growth and River Traffic

The industrial nature of the valley is reflected in the flow of traffic on the river. In recent years, coal and coke comprise about 33 per cent of the total ton miles; petroleum, 34 per cent; iron and steel, 20 per cent; and chemicals about 6 per cent. In terms of total tonnage, coal constitutes approximately 55 per cent of the river traffic. The growth in tonnages may be compared with the increases in the country's over-all production in certain selected commodities (Fig. 8). The tonnage of steel produced in 1958 was only slightly above the 1945 figure due to the economic recession of the latter year, but the tonnage of iron and steel shipped on the river was 300 per cent of that in 1945. During the 1945-1958 period, the nation's bituminous coal production declined about 30 per cent while the tonnage of coal shipped on the river more than doubled; petroleum shipments increased 90 per cent while the nation's increase was only 65 per cent. In the nine years from 1949 to

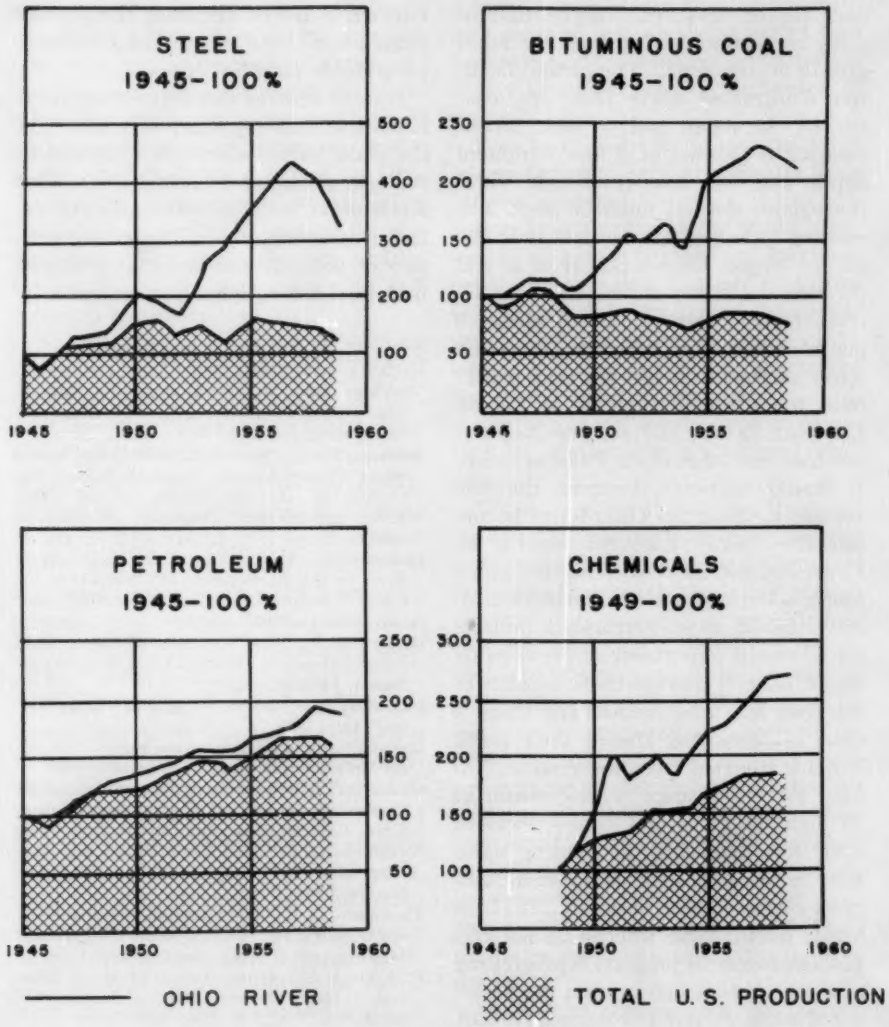

FIG. 8. Traffic flow on the Ohio River.

1958, the tonnage of chemicals carried on the river increased 175 per cent.[6]

The Future

The continued growth of industry at the 1950-1960 rate will be possible only if several serious obstacles are overcome. Specific sites favorable for industry from the standpoint of topography and overland transportation are limited. Developments of these sites are sometimes impeded locally by general antipathy, lack of adequate zoning, antiquated tax structures, and lack of labor and mature leadership. The most serious problem of the

[6] M. J. Barloon, "Statement Before Senate Select Committee on National Water Resources on the Importance of the Ohio River Improvement Program," February, 1960.

near future, however, will be that of acute congestion arising from the rapid growth of river traffic. The present facilities, constructed thirty years ago, consist of 46 dams and a lock system insuring a channel of 9 foot minimum depth and 300 foot minimum width throughout the 981 miles of river. The existing locks are one-way and only 600 feet in length. Over a period of several decades, the traffic on the river has increased at an average rate of almost 9 per cent per year. Presently, the Ohio River shipments are 50 per cent greater than the ultimate capacity of the St. Lawrence Seaway and are over one and one-half times that of the Panama Canal. It should be noted, however, that the average haul on the Ohio River is considerably shorter than that on the St. Lawrence, and the Ohio River is a much longer waterway than the Panama Canal. Nevertheless, these comparisons indicate the economic importance of the river today. It is likely that the traffic capacity of the river has been reached and there is some evidence that already some traffic is being diverted from the river due to local lock congestion. A new system of 19 high lift dams and double locks of 1,200 feet, replacing the existing structures, is being constructed under the auspices of the Corps of Engineers. It is highly questionable whether or not this vast improvement program is progressing at a pace fast enough to meet the anticipated traffic demands of the near future. Further, it is not agreed as to how the tremendous costs of the improvement program should be allocated.

For the reasons enumerated above, it is possible that expansion of industry in the Ohio Valley will reach a plateau in the near future and another spectacular acceleration, such as witnessed over the last decade, will depend upon the solution of political and financial problems both local and national in magnitude.

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A HIGH SCHOOL geography course must be adjusted to the student. A 10th, 11th or 12th grade classification means little, as it in no way indicates the ability of the student to think geographically. Nor does it indicate the kind of geographical training he has had.

The course must meet the student on

his level and take him as far as time and his ability permit. The course must be more than a text-reading assignment. It must acquaint the student with materials other than the printed page, and furnish opportunity to use pictures, maps, globes, statistical materials and the like, in securing facts needed in obtaining geographical understandings. The student should be an active learner, finding for himself, rather than being told and trying to remember.

The 10th grade seems the usual place for high school geography. The kind of course frequently depends upon the text used. Economic Geography, Commercial Geography, World Geography are some of the courses presented. World Geography has much to recommend it. Coming in the 10th grade, it is a companion of World History. Since, as a rule, World History students do not elect geography, or geography students World History, it provides a large group with its only overall view of the world.

World Geography needs an organizing theme that knits scattered world parts into a functioning whole. It should build an understanding of an interdependent world, a world of which the United States is a part. An excellent organizing theme for such a course is world trade, with the United States the core about which the course centers. The resources of the United States should be appraised. Its industrial capacity should be examined. Its place in the modern commercial world investigated. Through trade, remote lands contribute to our comfort and welfare, and we to theirs. Through trade, world oceans become world highways, connecting links rather than barriers.

A Résumé of Fundamentals

Globes. It is well to check the ideas, skills and abilities a student has when he commences his study of high school geography. There are certain skills and understandings that are essential.

Has he an understanding of the earth as a rotating and revolving globe? Can he relate to these motions the succession of day and night, and the succession of seasons?

Does he think of meridians and parallels as direction lines? Can he use them for that purpose?

Does he understand latitude and longitude? Can he use latitude and longitude in determining the location of places? Can he translate differences in latitude into miles? Can he use longitude in determining time? Does he understand Standard Time and Time Belts?

Can he account for the reversal of seasons in northern and southern hemispheres?

These are a few of the many things we too often assume the student can do, and to which he gives lip service without real understanding. Some textbooks present much of this material in introductory chapters. Such facts, however, are not assimilated and made workable by reading and memorizing definitions. They can be made to function through laboratory experiences with globes, especially desk and graphic project globes, and through well-chosen problems worked out as class exercises. Mastery cannot be achieved in an introductory unit, but through constant use whenever and wherever such facts and ideas are needed to explain activities or conditions in various parts of the world.

Maps. The introductory unit should also check the map reading abilities of the student and his skill in obtaining and using significant data from physical and political maps, rainfall, temperature, growing season, soil, crop, natural resource and population maps. With information from such maps can he account for the distribution of a specific crop or the distribution of population? Can he find reasons why some areas are similar and others different? Well-chosen map exercises afford opportunity to ana-

lyze map-reading difficulties, and indicate places where remedial instruction is needed.

The student does not instinctively know how to read maps. He must be taught and guided in map-reading and map use. He should be given an opportunity to use maps in the textbook. He should have experience with desk outline maps. He should have atlases and wall maps for constant reference.

Statistical Materials. The introductory unit should provide a variety of graphs and statistical tables and an opportunity to interpret them. Bar-graphs, pie-graphs, line-graphs, pictorial statistics should be included.

The unit should acquaint the student with sources of statistical material, tables in textbooks, and in publications such as the World Almanac and the Statistical Abstract of the United States. He should be asked to obtain statistical data and to present his findings in graphic form.

Survey of Resources of the United States

With the United States the core about which the course centers, the student should have an understanding of the resources of the country, their distribution, value and use. The human resources upon which the economy of the nation depends should be the first investigated. How many people are there? Where do they live in greatest numbers? How many are rural? How many urban? What is their distribution in age groups? —in occupations?

With only 12 out of every 100 living on farms, how is it possible for so few to feed the nation and supply materials for industry? An investigation of the resources of farms and ranches, the cereal crops, fruits, vegetables, fibers, dairy products and livestock should furnish an answer. Likewise, an investigation of forest resources, the lumber, pulpwood, naval stores; mineral resources, the fuels, metals and non-metallic minerals, helps in the understanding of national assets.

As an outcome of such investigations, the student should be able to associate the products of farms and ranches with specific states and areas of production. He should be familiar with the production patterns of the United States and able to explain them in terms of climate, soil and land surface.

Similarly, he should be familiar with the distribution of forests, their types and uses; also, with the distribution of coal, petroleum, natural gas and hydro-electric power associating them with specific states and areas and with the distribution of iron ore and other minerals.

Resource materials can be obtained from maps, graphs and statistics. Assignments should provide opportunity for the student to investigate and find out for himself. Finding for himself is too often neglected. It is a most important activity and should be emphasized more in geography courses.

A Survey of Manufacturing in the United States

Manufacturing provides another field for investigation: the iron and steel industries using basic raw materials and furnishing products that are raw materials for foundries, machine shops, automobile and airplane plants; the refining of petroleum, the manufacture of textiles, the processing of food in meat packing, milling, canning and freezing centers are some to be considered. The value of these products and volume should be presented in graphic form.

The pattern of manufacturing, the location of industries in relation to raw materials, power, labor supply and markets should be outgrowths of the unit. The question should be raised concerning the adequacy of our raw materials and our ability to supply our needs.

Marketing and Movement of Raw Materials and Manufacured Products

The movement of commodities is another field for investigation. The importance of such facilities as railroads, national and state highways, airways, pipelines and waterways such as the Great Lakes-St. Lawrence Seaway, should be considered.

This unit should develop transportation patterns, relating them to land surface, population centers, producing areas, manufacturing areas and the like. In this study commercial maps of railroads, airlines, state and national highways should be used. Great Lakes survey maps should be consulted.

United States Foreign Waterborne Commerce

Having considered the resources of the United States and its food producing and manufacturing activities, an investigation of foreign commerce should throw light on the relations of the United States with other producing and consuming areas. What do other nations buy from the United States? What does the United States buy from them?

The trade of a few selected ports should be investigated—New York, Philadelphia (Delaware River Port), Baltimore, the Ports of Virginia, New Orleans. The Annual Reports of Foreign Trade issued by the Port Authorities contain the essential information. Port Authority maps are also important.

Port assignments should be made so a small group is responsible for each port. Final reports should bring the group-findings to the class as a whole. From these group reports, a summary can be made covering the foreign waterborne commerce of eastern United States. To facilitate the work, some statistical materials should be provided in mimeographed form. Other materials should be taken directly from Port Authority reports. Suggestions are here given for the study of foreign waterborne commerce of the port of Baltimore.

PORT OF BALTIMORE

Exports and imports

How many long tons were exported?
What is a long ton?
What was the value of exports?

How many long tons were imported?
What was the value of imports?
How do imports compare with exports in tonnage?—in value?

Make a bar-graph showing exports and imports.
Interpret the graph.

Commodities exported

What export commodity leads in tonnage?
Which exports are farm products?
Which are manufactured products?

Exports by trade areas

Where do the exports go?
Which trade area is of greatest importance?
Which trade area takes the smallest volume of goods?

Export cargo by principal countries

What country receives the greatest export tonnage?
Which country ranks 2d?—3d?—4th?—5th?—6th?
Upon what is rank based?

The mimeographed table covers the leading 6 commodities exported.
Consult Port Report and secure additional names of countries receiving goods.
Place a red dot for each of these countries on an outline map of the world.

Exports to leading 6 nations

What commodity leads in tonnage?
Which commodities shipped are farm products?
Which commodities are manufactured products?
Which are products of mines?

What is the source of commodities shipped?
How did they reach the Port of Baltimore?

List of exports to a single country

Classify the commodities as products of mines, forests, farms or factories.
What do these export commodities suggest concerning the countries receiving them?
What do these commodities suggest concerning the United States?

Commodities imported

Consult mimeographed list.
What commodity is received in greatest amounts?
What commodity ranks 2d?

List commodities that are minerals.
List commodities of plant origin.

Are similar products produced in the United States?
If so, why are they being imported?

Imports by trade areas

What areas furnish the imports?
How do these areas differ from export trade areas?

How do import tonnages differ from export tonnages?
What does this suggest?

Imports by principal countries

What country furnishes greatest tonnage?
What is rank of Canada?—Liberia?
What makes up the greatest tonnage from Liberia?

Secure additional names of countries furnishing imports.
Place a blue dot on the world map for each of these.

The map now has 60 dots.
How do import and export distributions compare?

Imports from leading 6 nations

What commodity leads in tonnage?
What plant products are imported?
What manufactured products are imported?
Are the imports chiefly raw materials or manufactured products?

List of imports from a single country

Classify commodities as products of mines, factories, farms, forests etc.
Which type of commodity is imported in greatest amounts?

From this study it is found that coal makes up the largest export tonnage from the port of Baltimore, followed by wheat, corn, soybeans, coke, fertilizers, oats, barley and rye. Iron ore makes up the largest import tonnage, followed by petroleum, manganese ore, chromite, gypsum rock, sugar, bananas, sulphur, bulk molasses, liquid latex and zinc ore.

It is found that the European trade area is of greatest importance in the export trade and that the Netherlands received the largest and most valuable tonnages. The South American trade area is of greatest importance in the import trade, with Venezuela leading in tonnage and value of commodities.

Iron Ore and Ferroalloys in World Trade

The economic power of the United States is dependent on iron ore and metals used as alloys. Some of these strategic materials are among the imports into Baltimore.

With the help of maps and graphs on pp. 38-39 and 40 of *Goode's World Atlas* find information concerning the following:

Distribution of iron ore

Major producing districts.
Which of the districts sent ore to Baltimore?

How much of the world's iron ore is produced in the United States?
How much in the Soviet Union?
Where is the world's largest iron ore reserve?
How much of the world's steel is produced in the United States?
How much in the Soviet Union?

Distribution of manganese

Where are the greatest supplies of manganese?
Which of these districts sent ore to Baltimore?
What industry uses manganese? For what purpose?
What nation leads in manganese production?

Distribution of nickel

Where are the sources of the world's nickel?
What does the map indicate concerning the nickel supply of United States?
What nation leads in nickel production?
How is nickel used?

Distribution of chromite

Where are the sources of chromite?
What countries sent chromite to Baltimore?
What nation is greatest producer of chromite?
What nation ranks 2d?—3d?—4th?

Distribution of tungsten

What nation leads in world tungsten production?
How does the United States rank as a producer?
How does the Soviet Union rank?
How much of the world's supply is controlled by China and the Soviet Union?
What industries use tungsten? For what purpose?

Distribution of cobalt

Where are the greatest supplies?
How are these used?

Distribution of vanadium

What nation is the greatest producer?
What nation ranks second?

Distribution of molybdenum

Where are the greatest supplies?
How are these used?

Distribution of tin

Where are the sources of tin?
What nation is the greatest producer?
What nation ranks 2d?—3d?
How is tin used?

Distribution of bauxite

How does the United States rank as a producer?
What nations produce more than the United States?
How much of the world's supply do they produce?

In a recent year the following percentages of our raw materials were imported:

Tin	100%	Manganese	86%
Nickel	96	Bauxite	78
Chromite	91	Tungsten	59

What do these percentages suggest concerning the economic independence of the United States?

World Mineral Fuels and World Commerce

The industrial growth of the United States and the tremendous development of its communications require large quantities of mineral fuels and electrical energy. How does the United States rank in world production of power? Why is Baltimore an exporter of coal and an importer of petroleum?

Use maps and graphs in *Goode's World Atlas* pp. 3, 36, 37.

Petroleum

Find major producing areas bordering
Caribbean Sea
Persian Gulf
Caspian Sea
What nation is the world's greatest producer of petroleum?
What nation ranks second?
How much of the world's supply comes from
Kuwait?
Saudi Arabia?
Iraq?
Soviet Union?
Where are the largest petroleum reserves?
On map arrows indicate movement of petroleum in world trade
Check movement from Persian Gulf.
Where do the largest amounts go?
Check movement from Venezuela
Where do the largest amounts go?
Which of the producing areas contributed petroleum to Baltimore?

Coal

What country leads in coal production?
What country is second?—third?—fourth?
What country leads in coal export?
What country is second?—third?
Why is Baltimore well situated to export coal?
What coal carrying railroads serve the port?

Waterpower

How much of the world's total power is developed in the
United States?
Canada?
Japan?
Soviet Union?
Which continent has greatest potential waterpower?
Compare potential waterpower of Africa, Asia, Latin America and North America.

World Oceans as Highways for World Commerce

Use "World Ocean and Air Transport" map in *Goode's World Atlas.*

Consult list of principal countries in export trade of Baltimore

Find 10 nations that use the North Atlantic trade routes.
What ports serve these nations?
Find 7 nations that use Mediterranean routes.
What ports serve these nations?
Find a nation that can use both North Atlantic and Mediterranean routes.
Find 4 nations that use the Mediterranean-Suez route.
Which of these might be reached via Panama and the Pacific?
What ports serve these nations?
Find 4 nations that use Caribbean routes.
What ports serve them?
Find a nation that uses South Atlantic routes.
What ports serve it?
Find a South American nation that uses Panama-Pacific routes.
What are its ports?
What nation uses the Cape of Good Hope route?
What are its ports?

Consult list of principal countries in import trade of Baltimore

Find 6 nations that use North Atlantic routes.
Find 4 that use Mediterranean routes.
Find 5 that use Caribbean routes.
Find 5 that are African nations.
What routes do they use?
Find 4 South American nations.
What routes do they use?
Find 3 nations that use Panama-Pacific routes.

Canals that shorten ocean distances

Suez
- Location
- Length
- Type
- Operation, tolls, etc.
- Greatest tonnage
- Importance in world trade.

Panama
- Location
- Length
- Type
- Importance in world trade
- Importance in inter-coastal shipping of United States.

Conclusion

The port of Baltimore study furnishes part of the picture of the United States in relation to other producing and consuming areas. It suggests ways statistical reports, maps and graphs may be used in securing information. Similar studies of other Atlantic coast and Gulf ports, of Pacific coast ports and ports on the Great Lakes would complete the picture. These are suggestions for a course in high school geography. It should be clearly understood that such a course would be considerable work for the instructor and could not be handled by an untrained teacher. A variety of materials must be assembled to meet class needs. Guidance must be given in their use. The student must be an active learner and given opportunity to find out for himself.

The completion of such a course would give the student an idea of the forces that enter into the relationship of nations. The strength of a nation is in proportion to its available resources, their development and their use in the country's economy as well as in their place in world trade.

NAVIGATING WITH THE KAMAL

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HISTORICAL, archaeological, and folkloric studies all indicate that Arab seamen, in ancient times, had extensive commerce across, and probably far beyond, the Indian Ocean; and along the coasts of Africa, perhaps to Madagascar. Some of the evidence suggests that the ancestors of Sinbad journeyed regularly to the Spice Islands (Moluccas), and perhaps even to Cipangu and Cathay.

Although much of the surviving evidence is unclear and disputable, for the Arab sailors tended to be illiterate, and hid their navigational and cartographic knowledge from their business competitors. we find in the Ptolemaic maps some correct information about "India Extra Gangem," and some Roman maps place China (Seres) beyond India and beyond the Mare Caspium. Ancient Arab cartograms also show China in rational relation to the rest of the known world, many centuries before the memorable (and perhaps overpublicized) journeys of Marco Polo (ca. 1290).

Some historians and ethnographers, half a century ago, cited the Moslem faith of the Filipino Moros as proof of Arab travel to those islands some time prior to their discovery by Magellan (March, 1521). More modern evidence indicates that the Moros were actually Malays who migrated to the Philippines

after 1200 A.D. and before 1520 A.D., carrying their Moslem faith with them. This same evidence shows, however, that the Arabs had extensive travel to, and influence in, the Malay peninsula, during the period 0 to 578 A.H. (522 to 1200 A.D.).

Until recently, it was supposed that the early Arab voyagers traveled along the coasts to get from the Red Sea and the Persian Gulf to the Spice Islands (and perhaps beyond), even though the monsoon wind pattern of the Indian Ocean would make such travel extremely difficult, at most seasons, for a sailing dhow, or similar primitive vessel. Present evidence suggests, however, that the Arabs understood the seasonal changes in the monsoons, took advantage of this wind pattern, and probably, on their longer voyages, spent weeks, or even months, out of sight of land.

The Kamal

The only navigational instrument known to the Arab seamen of ancient times was the Kamal, a crude but effective instrument consisting in its simplest form of a stick and a piece of string. With it, by means of sights on Polaris, they were able to determine whether they were north or south of a chosen latitude. By use of a Kamal, an illiterate Arab shipmaster could find a specific parallel of latitude; and, using the sun and stars to determine direction, could sail along it until he reached his desired destination.

We know from plentiful evidence that the Arabs were competent astronomers, and that ability to determine directions from the sun and the stars was widespread in the Arab world some centuries B.C. Despite numerous hints, we do not know when the Arabs learned of the magnetic compass, and we have no assurance that they made navigational use of such knowledge as they had much before 1400 A.D.

In its more sophisticated form, the Kamal consisted of a rectangular block, of wood or ivory, to which was attached a knotted string, usually with seven knots. This gave the shipmaster, or the ship's necromancer, a choice of fourteen latitudes, provided he could remember the significance of the knots and the positions of the sighting block. A forgetful shipmaster was likely to end up in the cooking pots of the anthropophagi!

Historical Reports

The Kamal and its navigational utility first became known to the Christian world in 1498, when one of Vasco de Gama's Arabian pilots demonstrated the device to the great Portuguese navigator and his officers. From the surviving literature of that era we have several good descriptions of the Kamal, its use, and the way in which it was made. We know that the Kamal was a traditional navigating instrument among the Arabs, but have no definite clue to the date of its origin. Some Arab and Hindu astronomers, as long ago as 1500 B.C. had suffiicent astronomical knowledge to make and use the Kamal; but we have no assurance that they did so.

These early astronomical descriptions also describe the use of the Kamal. The knot at the end of the string was held between the teeth. The stick was held in the hand, care being taken to be sure that the string was kept taut, and that the stick was perpendicular to the string. The lower end of the stick was aligned with the horizon, and the relation of the upper end of the stick to the star in question (usually Polaris—the North Star) was noted. Method of using the Kamal, demonstrated with a modern instrument made according to the old instructions, is shown in Figure 1.

Fundamental Theory

From simple trigonometry, it should be obvious that the angle subtended at the observer's eye by the stick of the

Fig. 1. Method of using the Kamal, here shown with a modern instrument.

Kamal will be the same at all times. If the bottom of the stick is aligned with the horizon, the angle of elevation of the top of the stick will always be the same (provided the stick is held perpendicular to the string, and also at right angles to the horizon). Angular relations here are shown in Figure 2, A. From this information, we can construct a Kamal for any desired latitude. That shown as a sample in Figure 1 was so constructed for "homing" on the Golden Gate (Lat. 37°47′ N.); and has a string length of 24″ and a stick length of 16-27/64″.

Fundamental Limitations and Attainable Accuracy

The intelligent user of any instrument wants to know not only what the instrument is supposed to do, but also "just how good is it?" To determine these practical limitations, a number of Kamals were made and field tested, with interesting results.

Experiments showed that a Kamal using an ordinary piece of string was consistent only within about plus or minus five degrees, due to stretching and shrinking of the string. This difficulty was eliminated by using high-grade surveyor's cord, impregnated with beeswax, and then hung under tension for several weeks before using.

With a non-resilient string, angular consistency of the Kamal was slightly better than plus or minus one degree, which seems to be the practical limit for a device of this kind. Some difficulty was noted with bifocals and rocking bridgework, a problem which did not plague the ancient Arabian mariners.

Use of the Kamal requires "looking in

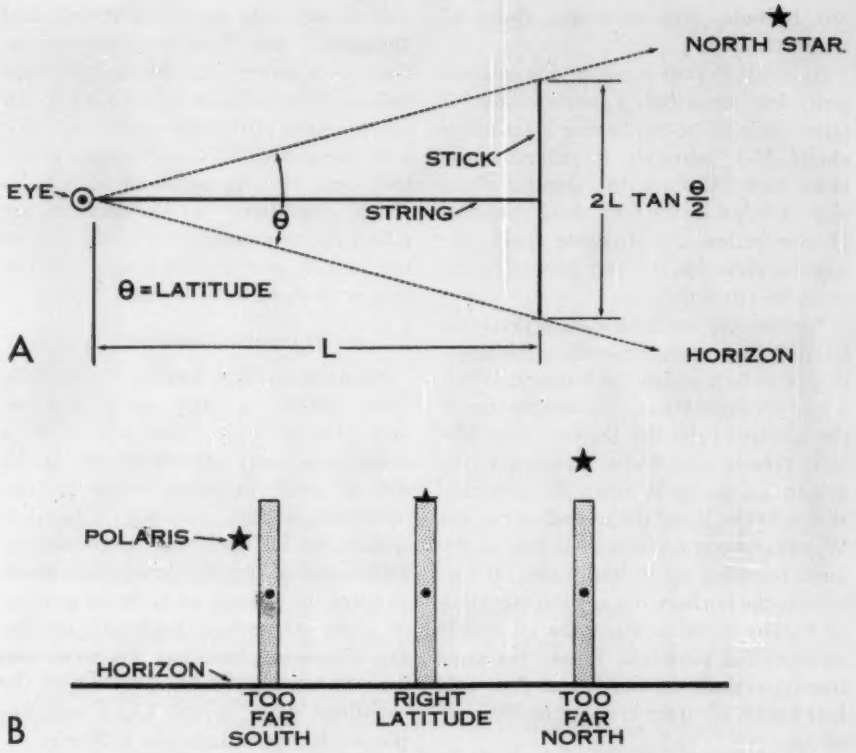

FIG. 2. A. Angular relations inherent in the Kamal. B. Latitude indications with the Kamal.

two directions at once." This is a difficulty easily overcome by practice provided the angle subtended at the eye is less than about 50 degrees of arc. If the angle is greater, attainable accuracy declines rapidly. This indicates that the Kamal is most useful in low latitudes (where it originated); that it is usable in middle latitudes; and that its use is not recommended for latitudes much beyond 50 degrees north.

South of the Equator, the Kamal is of very little practical use, as there is no convenient stellar indication of the south celestial pole. Although latitudes may be determined by stellar observations in the southern hemisphere, this determination requires, in general, better instruments and more advanced methods than were available to the Arabian seamen of ancient times. We know that the southern constellations were studied by the ancient Arabs, for many of them have Arabic names; and these names are found engraved on ancient star charts and astrological instruments. Notable among these are the beautifully-constructed astrolabes, made more than 1,000 years ago in Isfahan (then Persia, now Iran).

Polaris Correction

According to common belief, the North Star (Polaris) is directly above the North Pole, and infinitely distant from Earth. In consequence, if we measure the angular elevation of Polaris, from any point on Earth where it is visible, we have also determined the latitude of that point. This is almost correct, and such a measurement, carefully made, will give us

our latitude, plus or minus about 55 nautical miles.

Actually, Polaris is not at the celestial pole, but describes a circle about it (once each 24 hours) having a radius of about 55.4 minutes. In consequence, twice each 24 hours, the angular elevation of Polaris is the latitude of the point of observation. At all other times, the angular elevation is either greater or less than the latitude.

Fortunately, we have some dependable celestial clues to the time when the elevation of Polaris equals the latitude. When a line through Mizar (the double star in the handle of the Big Dipper—Ursa Major), Polaris, and Delta Cassiopeia (the fourth star in the W when the constellation is in the West; the second star in the W when the constellation is east of Polaris; counting up in both cases), is parallel to the horizon, the angular elevation of Polaris is the latitude, for all simple navigational purposes. When this same line is vertical, the bearing of Polaris is true north, accurate to about one minute of arc.

Failure to make this correction today will produce a position error of only about two days' walk. Usually, such a small error in navigation is unimportant, as sighting of familiar landmarks permits correction of course before the error becomes serious. In ancient times, however, Polaris was not 55.4 minutes from the celestial pole, but more than seven degrees off, due to precession of the equinoxes, proper motions of the stars, and other changes of a lesser nature. During this time, failure to make a Polaris correction might put the ship off latitude by as much as 500 statute miles, with serious results, particularly to the inept navigator or "necromancer."

The problem of Polaris correction was known in ancient times, and many "Rules of the North Star," most of them rational and workable, remain to us today as evidence. Arab users of the Kamal were aware of the motion of Polaris, and apparently took their latitude observations only when the circumpolar stars had a specific relation to the horizon. In consequence, although they may not have measured latitude in our terms, they were able, by use of the Kamal, to return consistently to the latitude for which the instrument was made, and to tell, at least once each 24 hours, whether they were above or below that latitude.

Practical Consideration

An Arab mariner, seeking to reach the Spice Islands, actually needs to know only a few critical latitudes, and needs to know these only approximately. If, by use of crude instrumentation, he can come within "sight distance" of familiar landmarks, his navigation is satisfactory and successful. For this journey, he needs to know the latitude of his home port, or of some convenient landmark nearby. We will assume here that this home port is at the head of the Persian Gulf, on the combined delta of the Tigris and Euphrates Rivers, in Latitude 30 North.

En route, he must round the southern tip of Taprobana Island (Ceylon), probably stopping somewhere in that area for food and water. In consequence, he needs a Kamal which would indicate approximately 6 degrees North Latitude. This also happens to be the latitude of the western entrance to the Straits of Malacca, critical seaway to the Spice Islands, and passage from the Indian Ocean to the South China Sea.

From the Straits of Malacca to the Spice Islands, he will not only be south of the Equator, where a Kamal is not useful; but he will also be able to navigate by "caping" (sighting on landmarks) through the Java and Banda Seas to the Moluccas, which are centered on the Equator, where Polaris is above the horizon for half the time.

Thus, it would be possible to navigate from the Persian Gulf to the Spice Is-

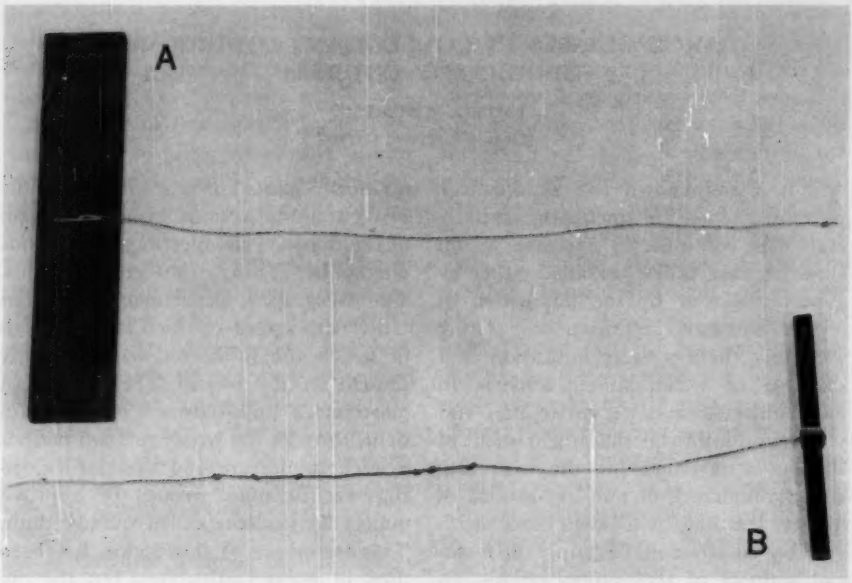

FIG. 3. Kamals constructed for specific sea journeys.

A. Kamal for the trip from the head of the Persian Gulf to the Spice Islands and return. Critical latitudes are 30 degrees North and 6 degrees North.

B. Kamal constructed for use on the western coast of North America. Knots, from left to right, are for Acapulco, Mantanchel (San Blas), Cabo San Lucas, Cedros Island (also Viscaino Bay), San Diego, San Pedro (port of Los Angeles), and Monterey (the ancient capital of Alta California).

lands, and return, using, as a navigation instrument, a Kamal consisting of a rectangular block and a single string. The high latitude setting would be that of the home port, roughly 30 degrees north; the low latitude setting would be that of Dondra Head (Ceylon), approximately 6 degrees north. This would also show the entrance to the Straits of Malacca.

A Kamal (of modern manufacture) meeting these conditions is shown in Figure 3, A. Because of the strong possibility that Kamals were used as navigation instruments on the Manila Galleons, which sailed annually from Manila (Philippine Islands) to Mantanchel and Acapulco (then New Spain, now Mexico), a similar instrument, shown in Figure 3, B, was made for salient points in western North America, from Monterey south to Acapulco. Field checking shows that this instrument, constructed "according to formula," is sufficiently accurate for California coastwise navigation.

Summary and Conclusions

Investigation of the construction and capabilities of the ancient Arabian navigation instrument, the Kamal, shows that it can be used effectively to indicate consistently the latitude or latitudes for which it is made, with a probable error of slightly less than one degree, provided suitable North Star correction is made, and provided also that the string is prevented from stretching and shrinking.

The Kamal apparently was the ancestor of a family of navigational instruments which included the cross-staff (used by Columbus), and the back-staff (c. 1590). All were replaced, shortly after 1750, by the sextant, which, with minor modifications and improvements, is today's principal navigation instrument.

LARGE CLASSES IN COLLEGE INTRODUCTORY GEOGRAPHY COURSES*

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IT IS A well-known fact that college enrollments are increasing rapidly and will continue to increase at an alarming rate, unless curtailed either by a major war or by the imposition of severe entrance requirements. Along with this, there is every indication of a shortage of well-qualified teachers in most subject areas of the curriculum, and it is very doubtful if the procurement of additional revenues for the operation and maintenance of our institutions of higher learning will keep pace with growing enrollments. Certainly the financial support of state-supported institutions of higher education normally lags well behind increases in the size of the student body. To teach increasing numbers of students with essentially the same staff means larger class enrollments. As a result, it seems that we could well look into the question as to whether a beginning course in geography can be taught effectively to large classes.

In the school years 1955 through 1957 at Miami University, an experiment was conducted in the effectiveness of large class instruction. This experimental program had the financial aid of a grant from the Fund for the Advancement of Education. Four techniques were used in instructing large classes and many subject disciplines were involved in the project. The four different types of large-group procedures in the over-all experimental program were: 1) Sections taught by closed circuit television; 2) Large classes in which the instructor was physically present in the room; 3) Independent study sections with a reduction of the normal class meetings; 4) Sections taught by graduate student assistants. The Geography Department at Miami University agreed to teach large sections in which the instructor was physically present in the room.[1] The large class (enrollment varied from 85 to 155 students through the years) met two periods a week for lecture and the third meeting was in small groups of approximately 25 students called quiz sections. This technique of instruction has been used in many institutions, but the opportunity that was presented in the experiment was that an instructor would teach both a large section and an additional small class which would have 25 to 30 students. The small class would be the control section, against which the performance and attitude of the large class would be statistically checked. Thus, we had an opportunity to determine the effectiveness of large-class instruction.

Over the period of three years, the mean scores on the final examinations (both groups took the same final at the same time) varied less than two and one half per cent. In fact, one year the large class had a higher final examination average than the small class.

This would indicate that both groups acquired essentially the same amount of geographic knowledge. We did find that one instructor, of the three that originally started this program, seemed to be

* A preliminary report of the Miami University experiment was made by Robert F. Perry, "A Teaching Experiment in Geography," THE JOURNAL OF GEOGRAPHY, Volume LVI, No. 3 (March, 1957).

[1] The Miami University beginning geography course is entitled "Essentials of Geography." The first semester is a non-laboratory systematic physical geography and the second semester is a systematic treatment of cultural geography.

more effective in the teaching of small classes than in large classes, consequently his future assignments were with conventional classes.

In a study of this type, it is not sufficient simply to judge the effectiveness of large class instruction through the knowledge learned by students. There are other factors that must be considered, such as what are the attitudes of the students (in both groups) toward the course content, what are the student's attitudes towards large classes, and how would these two groups rate the college instructor. For example: Does the student feel, since he is a member of a large group, that he has lost something through not have a more direct contact with his professor?

Students' Attitude Toward Course Content

In comparing the attitude of the large class with the small class towards course content, the students were given a questionnaire covering 41 questions, such as:

1) As a result of this course, I have been stimulated to a good deal of additional reading on the subject matter (aside from class assignments).
2) The content of this course might best be described as "much ado about nothing."
3) I frequently look for an excuse to miss one of these classes.
4) I frequently found myself wanting to discuss what I had learned in class with friends.
5) Even if I have the chance in the future, I will avoid having anything further to do with this subject.
6) This class is responsible for making me consider a vocation in this subject area.

The scale of the questionnaire was set up so that if the answers were extremely favorable, the rating would be 1; if extremely unfavorable, the rating would be 9; and an average rating would be 5. In the three-year period, the ratings of the large classes varied from 3.59 to 3.88; these were definitely favorable ratings. The ratings in the control sections varied from 3.37 to 3.61, which were also above average ratings; and there was no statistically significant differences in the attitudes of the two groups. Occasionally some of the answers to the individual questions left much to be desired. For example, in answer to the question, "I frequently look for an excuse to miss one of these classes," the percentage varied from 20 to 2 per cent in the large classes and from 5 to 3 per cent in the small classes. I am sure all college instructors would hope that the percentage would be zero in both groups.

Students' Attitudes Toward Large Classes

To consider the students' attitude toward large classes, they were given a questionnaire containing 25 questions, such as:

1) There are fewer distractions in a large class than in a small class.
2) The fact that I cannot interrupt the lecturer in a large class as easily as in a small class seriously diminishes the value of large-class instruction.
3) Large classes are so impersonal that I hesitate to see my instructor during his office hours.
4) I miss a feeling of personal contact with my large-class instructor.
5) I hear the instructor as well in a large class as in a small class.

Once again a 9 point scale was used in which 5 would be the average. In the three-year period, the ratings varied from 5.30 to 5.45 showing a slightly unfavorable reaction to large-class instruction. However, it was a much better reaction than was expected.

Students' Attitude Toward the Instructor

The reaction of both groups to the instructor was obtained from answers to a questionnaire which once again was based on a 9 point scale where 5 was the average. Some of the questions that were asked to evaluate the effectiveness of the instructor were: Did he

1) Give well-organized lectures?
2) Make major points clear?
3) Show enthusiasm in his teaching?
4) Make sure students understood difficult points?
5) Hold the interest of more than just the brightest pupils?

The experimental class gave ratings varying from 2.82 to 3.58 which were definitely favorable. The small control sections rated the instructors from 2.71 to 3.10 which were slightly more favorable ratings but there was no statistically significant difference. In fact, when the students in the large class were asked if they could have the same instructor in either a large class or a small class, in one year 47 per cent stated that it would make no difference to them. When students in the large class were given the proposition: There is a professor that you like and the only way you can take a course from him is to enroll in a large class, would you or would you not elect his large class? Under these circumstances, 95 per cent of the students in one large lecture indicated a willingness to take the large class.

Large classes forced the instructor to realize that techniques of instruction that were effective in small groups were not satisfactory in large classes. Not only did new techniques with more visual aids have to be devised, but with large numbers, objective examinations that could be machine graded had to be used. This meant considerable care had to be taken in devising a testing instrument that would test not only fact, but also the ability of the student to apply facts, and to use facts, generalizations, and established geographic principles in a thinking process.

The Geography Department prepared a series of maps to aid the students in study and to be used in testing. For example, three maps on world climates were made. One map had each climatic type outlined with a number for each specific climate; for example, all tropical rainforest climates had the number one, all savanna climates had the number two, etc. The second climate map had the same boundaries but no numbers appeared on the map. Students would use the map for study purposes, or at a later time, for correlating agriculture, population, or other items that may be related to climate. The third map was specifically made for the final examination. Each climatic area bore a different number so that multiple choice questions could be asked with reference to the map. Maps were lithoprinted for not only climate but also for soils, vegetation, mineral products, various agricultural products, and political divsions. For testing purposes, some maps were reproduced directly from the textbook with the titles blanked out. The students were asked on examinations whether a particular map was a map of, for example, the production of cotton, tea, cacao, grapes, or tobacco. All of these were but a few devises which the instructors felt increased the effectiveness of teaching and testing large classes.

At the close of the experimental program, the instructors stated that they would prefer to teach small classes. However, as pointed out at the beginning of this paper, this is a luxury which many institutions can no longer afford. The result of the experiment has been to prove that large class instruction can be used to a fairly high degree of effectiveness in teaching a beginning course in geography. The success depends largely

upon the instructor. It was found that some instructors could teach small classes significantly more effectively than large classes and some instructors could do both effectively. The Geography Department staff at Miami University knows that it has instructors who can teach both; and, as a result, large classes have been continued because of enrollment pressures. It is also believed, even though the department did not experiment with it, that the beginning geography course would lend itself to TV instruction.

WATER FOR AMERICAN CITIES

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Introduction

THE WATER SUPPLY of American cities is an important topic in teaching geography of the United States, because the people in America are concentrated in cities which need great quantities of water. However, this topic has not been adequately introduced or brought up to date by textbooks. The purpose of the present study, therefore, is to provide additional teaching materials about the use, consumption, and supply of water for American cities.

Use of Water

The amount of water used in the United States increases annually largely because of population growth and improvement of economic activities. In 1950, this country used about 185 billion gallons of water daily compared with 299.3 billion gallons in 1958, or 322.9 billion gallons in 1959 (Table 1). According to the President's Materials Policy Commission, the nation may need about 350 billion gallons of water per day in 1975. The *New York Times* estimated that the national daily use of water in 1980 may be 494.4 billion gallons.

Cities use more water than other areas. For example, of the 322.9 billion gallons of water used daily in 1959 mentioned above, about 181.9 billion gallons were from industrial and municipal water systems which supplied mostly cities. The remaining 141 billion gallons were used for irrigation (135 billion gallons) and domestic and other purposes (6 billion gallons) in rural areas.

In cities, industries use much more water than is used for domestic and other purposes. More industrial water is used for generating steam-power than for making other manufactured products. To produce steam-power from one ton of coal uses 600-1,000 gallons of water. The amount of water used for making other manufactured products varies. For example, about 18,000 gallons of water are needed for making one ton of iron ingot. From 7,700 to 90,000 gallons of water are used for making one ton of paper, depending on the raw materials and processes used.

The water used by industries is for the following purposes: cooling, processing, feeding boilers, cleaning, and disposal of waste. A survey by the National Association of Manufacturers in 1950 disclosed that in factories whose intake was more than 10 million gallons a day, 54 per cent of the water was used for cooling, 32 per cent in processing, 9 per cent for boiler feed and 10 per cent for cleaning and disposal of waste. The total, which is more than 100 per cent, includes the 5 per cent of the intake that was reused. In the plants using less than 10 million gallons

TABLE 1

THE USE OF WATER IN THE UNITED STATES[1]

Use group	Daily use (billion gallons)				
	1950	1958	1959	1975[2]	1980[2]
Industrial water system	80	146.0	159.9	215	277.0
Steam-power		90.0	98.7		162.0
Others		56.0	61.2		115.0
Municipal water system	17*	20.0	22.0	25*	32.0
Irrigation	88	127.5	135.0	110	178.0
Rural-domestic	**	5.8	6.0	**	7.4
Total	185	299.3	322.9	350	494.4

[1] *The Statistical Abstract of the United States*, 1959, p. 165.
[2] Estimated by the President's Materials Policy Commission.
[3] *The New York Times*, June 5, 1960, p. 6.
* Including the water for rural-domestic uses
** Included in municipal water system.

daily, cooling took 23 per cent of the pumpage; process water, 36 per cent; boiler feed, 12 per cent; cleaning and disposal of waste, 29 per cent.

Most industrial water is fresh water, although salty water is sometimes used for cooling, cleaning, or disposal of waste. The cooling water should be low in temperature, preferably less than 60°F. This has to be considered in using water from areas where water temperatures rise above 60°F. Water used for processing must contain less than 10 parts per million of suspended solids and not more than 100 parts per million dissolved solids.[1] Water for feeding boilers should not be such as to cause corrosion or scaling at high temperature.

Although many industries supply their own water needs, yet in 1954 some manufacturers took 1,663 billion gallons of water from municipal systems. This was about 14.1 per cent of the total industrial intake of water. In 1959, they took 16 per cent of the total industrial intake.

Water from municipal systems is used mostly for domestic purposes. According to M. A. Pond, the minimum amount of water necessary to carry out the function of life properly is 20 gallons per capita daily. He allowed 1 gallon for drinking, 6 gallons for laundry, 5 gallons for personal cleanliness (but without tub or shower bath), and 8 gallons for two toilet flushes.[2] He added 25 gallons for a tub-bath or 5 gallons per minute for a shower.

These estimates, however, do not include water used for cooking and sprinkling lawns. Also, they do not take into consideration the fact that people drink more water in summer than in winter. Generally speaking, high-income families with modern housing facilities use more water than low-income families with obsolete dwelling units. For example, in 1947, low-income families in 15 Illinois communities used as little as 10 gallons of water per capita daily compared with the 52 gallons used by high-income families.[3] Some water-saving measures, such as Dry Friday in New York City during 1950, may have affected the amount of water used domestically.

Largely because of the varying

[1] Thomas J. Powers, *Industry's Water Problem*, Illinois State Water Survey Bulletin, No. 41, p. 125.

[2] H. E. Jordan, "The Problems That Face Our Cities," *The Yearbook of Agriculture, 1955, Water*, pp. 651-2.
[3] *Ibid.*

amounts of water used for industries and homes, the per capita daily use of water in American cities varies. Among small cities of over 10,000 population, East Grand Forks, Minnesota, used 57 gallons of water per capita daily in 1944 as compared with 205 gallons used in Muscatine, Iowa, in 1956. In 1955, New York City used 196 gallons of water per capita daily. The figure for Los Angles during 1958-59 was 179 gallons.

Consumption of Water

Only a small portion of the water used by industries and for domestic purposes is actually consumed. In 1954, industries took in 11,757 billion gallons and discharged 10,677 billion gallons of water. The actual consumption including loss was only 1,080 billion gallons, or 9.3 per cent of the total intake. According to K. O. Kohler, Jr., "the efficiencies with which farmers apply their irrigation water to their crops may range from 15 per cent to 90 per cent, that is, from 15 to 90 per cent of the water they turn onto a field will be made available to the plant roots; the remainder will be lost as runoff, deep percolation, and evaporation."[4] About 10 per cent of the municipal or domestic water used is consumed.

Supply of Water

The supply of water for the various uses mentioned previously comes indirectly either from precipitation or runoff. P. Meig estimated that the average annual rainfall for the United States is 30 inches or 5 billion gallon acre-feet.[5] Of these, about 26 per cent, or 1.3 billion acre-feet, are runoff. Using the ratio of 892.7 gallons of water daily per acre-foot, the runoff is about 1,160.5 billion gallons daily. K. O. Kohler, Jr. estimated that the national supply of water from precipitation averages 4,300 billion gallons a day.[6] Of these, about 30 per cent, or 1,290 billion gallons, are runoff.

These two estimates differ slightly from each other, but they indicate that the runoff in the United States is greater than the amount actually used. The estimated use of 350 billion gallons of water daily for 1975 by the President's Materials Policy Commission and a recent estimate of 494 billion gallons to be used daily in 1980 account for only less than half of the estimated runoff mentioned previously.

However, many high runoff areas, such as the Appalachian, Rocky, Cascade, and Sierra Nevada mountains, need little water (Fig 1). On the other hand, some major users require more water than local supplies from a runoff source. "For example, the 17 Western States, which have about 94 per cent of the irrigated land and 60 per cent of our land area, receive only about 25 per cent of the total precipitation."[7] According to J. J. Borchert, cities in 45 counties do not have an adequate supply of water from local sources.[8] Over 86 major rivers or lakes have been tapped by 380 communities. Typical examples of cities using distant water are Los Angeles and New York City.

Los Angeles depended on the Los Angeles River and local wells (93 in 1959) for all the water needed before 1913. During that year the city built a 233 mile aqueduct tapping water from the Owens Basin near Sierra Nevada at a cost of $24,500,000. The aqueduct was extended 105 miles further to the north tapping additional water from the Mono Basin

[4] K. O. Kohler, Jr., "Trends in the Utilization of Water," *The Yearbook of Agriculture, 1955, Water*, p. 37.

[5] P. Meig, "Water Problem in the United States," *Geographical Review*, 32 (1952), 346-66.

[6] Kohler, Jr., *op. cit.*, p. 36.

[7] *Ibid.*

[8] J. J. Borchert, "The Surface Waters Supply of American Municipalities," *The Annals of the Association of American Geographers*, 44 (March, 1954), 15-32.

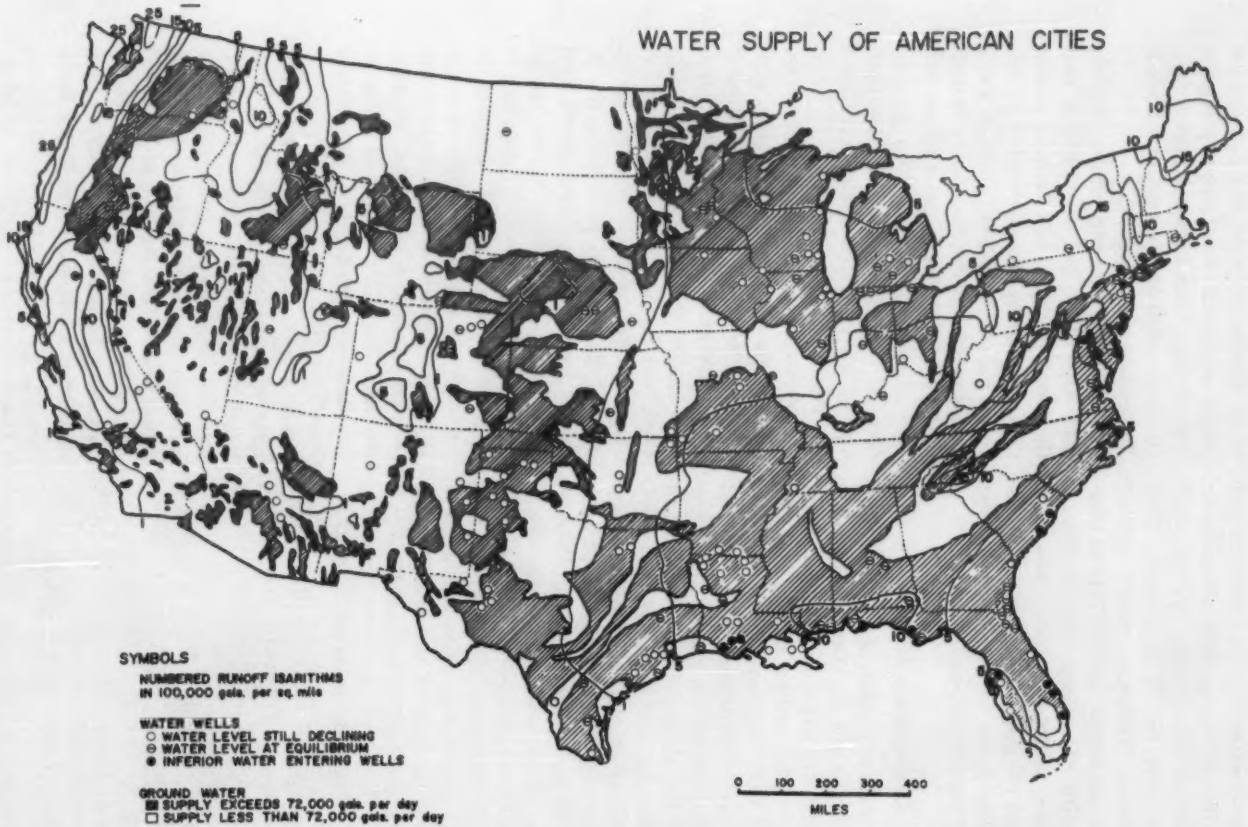
WATER SUPPLY OF AMERICAN CITIES
SYMBOLS
NUMBERED RUNOFF ISARITHMS
IN 100,000 gals. per sq. mile
WATER WELLS
○ WATER LEVEL STILL DECLINING
⊖ WATER LEVEL AT EQUILIBRIUM
● INFERIOR WATER ENTERING WELLS
GROUND WATER
▩ SUPPLY EXCEEDS 72,000 gals. per day
□ SUPPLY LESS THAN 72,000 gals. per day
0 100 200 300 400
MILES

FIG. 1. This map is based on the following sources: 1) H. E. Thomas, *The Conservation of Ground Water*, New York, 1951; and 2) W. B. Langbein, *Annual Runoff in the United States*, U.S. Geological Survey, Circular 52, 1949. Modifications are made by the author for a matter of simplicity. The yield of 72,000 gallons daily per well is based on 50 gallons per minute. The cartographical work was done by Mr. Jerry Kimball, one of the author's students at Eastern Illinois University.

TABLE 2

SURFACE AND GROUND SOURCES OF WATER SUPPLY IN THE UNITED STATES, 1959[1]

Use group	Daily use (billion gallons)	Percentage	
		Surface water	Ground water
Industrial water system	159.9	92.7	7.3
Steam-power	98.7	99.9	0.1
Others	61.2	81.1	18.9
Municipal water system	22.0	74.2	25.8
Irrigation	135.0	73.9	26.1
Rural-domestic	6.0	7.0	93.0
Total	322.9	82.0	18.0

[1] *The Statistical Abstract of the United States*, 1959, p. 165.

in 1940. In 1941, a new 242 mile aqueduct was completed tapping water from the Colorado River about two miles north of Parker Dam or 153 miles south of Hoover Dam below Lake Mead. The initial cost was $220,000,000.

During 1958-59, the city used 456 million gallons of water daily, of which 62.6 per cent was supplied by the Owens and Mono Basins; 21.2 per cent, by the Los Angeles River and local wells; the remaining 16.2 per cent, by the Colorado River.[9]

Los Angeles uses only 74 million gallons of water from the Colorado River, about 19 per cent of the intake of the Colorado River's aqueduct. The remaining 81 per cent is used by other cities, such as San Diego, in the metropolitan water system. Los Angeles is entitled to use five times more water than it does from the Colorado River, but additional usage would interfere with the needs of other users, in particular those adjacent to the Colorado River below Parker Dam. Also, the river's discharge at Lake Mead near Hoover Dam is only 19,000 second-feet compared with 27,000 second-feet from the Wabash River at New Harmony, Indiana so that the supply is actually limited. In addition, a large portion of the water discharged below Lake Mead is lost through evaporation.

A potential source of water supply for Los Angeles is the Feather River Project located in the northern part of California. If the 1,750 million dollar bond issue is approved, this project will provide 1,800,000 acre-feet or 1,607 billion gallons of water daily for Los Angeles and its adjacent areas.

New York City started to import water in 1841, when a 30 mile aqueduct was completed tapping about 100 million gallons of water daily from the Croton River.[10] From this river a new aqueduct, three times bigger, was added in 1893. In 1927 the Catskill aqueduct was first used tapping an additional 550 million gallons of water per day. In 1955 an 85 mile aqueduct was completed tapping a maximum of 800 million gallons of water daily from the Delaware River. The total supply from the above mentioned four aqueducts is 1,750 million gallons per day compared with 1,550 million gallons used daily in 1955.

In addition to the gap between local runoff and demand of water mentioned above, there are other supply problems, such as siltation of reservoirs and declining supply of water from wells. Many reservoirs store water from rivers and lakes which supply 82 per cent of the water used in 1959 (Table 2). Most large cities depend on surface water for

[9] Los Angeles Board of Water and Power Commissioners, *Water and Power, 58th Annual Report, 1958-9*, pp. 6-7,

[10] Nelson M. Blake, *Water for the Cities*, The Syracuse University Press, Syracuse, 1956, pp. 277-8.

their major supply. However, silting is a problem facing many reservoirs. According to C. B. Brown of the Department of Agriculture, 21 per cent of the nation's water supply reservoirs will have a useful life of less than 50 years, another 25 per cent will last from 50 to 100 years, whereas only 54 per cent will provide enough storage to suffice for present requirements 100 years from now.[11] The reason for this is siltation. Also, siltation itself is an indicator of soil erosion and a major source of pollution.

Wells supply a considerable portion of the water used in the United States, being 18 per cent in 1959. Many small towns depend on wells for their major supply of water, such as Moorhead in Minnesota and Valley City in North Dakota. According to S. A. Changnon, East St. Louis in Illinois uses more well-water per capita than any other American city.[12] Several large cities depend on wells mainly, most of which are located in the Gulf States, such as San Antonio in Texas, Memphis in Tennessee, and Miami in Florida. The concentration of large well cities in the Gulf States occurs principally because subsurface materials there are porous and provide many aquifers with high yields of water. Also, the climate in these areas is humid.

However, the supply of water from wells has declined largely because of excessive withdrawal, which is a major cause for the dropping of water tables in many wells. In the San Gabriel Valley near Los Angeles the water tables of some wells dropped 21.8 feet between 1904 and 1926. In the Chicago-Joliet district in Illinois, the water tables dropped 400 feet between 1890 and 1950.[13] In Clinton, Iowa, the water table is so low that some wells have had to be made 2,100 feet deep. The dropping of water tables reduces water capacity in wells. For the same reason many shallow wells become dry.

Also, the lowering of water table is a major reason for many wells in the Atlantic and Gulf coastal areas which tap aquifers below sea level and which are encroached by salty water (Fig 1). The wells in Beaumont-Port Arthur, Texas, yielded 20,000,000 gallons of water daily. Now, many wells there are closed because of the encroachment of salty water, and other wells yield a total of only 1,000,000 gallons a day. For the same reason, Texas City, Texas, closed all its wells.

Conclusion

In order to improve water budget, several things must be done. First, siltation should be checked by improving land uses in order to reduce soil erosion. Second, wells should not be over-withdrawn. Third, some excessive runoff can be stored for emergency use or piped to needy areas. Fourth, more water can be reused. In 1954, the amount of industrial water reused was only 63.4 per cent of the discharged water. In 1960, only 70,000,000 persons in the United States used secondary water.[14] Secondary water after treatment is as good as treated fresh water. As a matter of fact, many communities still use untreated raw water which may be inferior to the treated secondary water. Finally, there is a possibility of using more salty water for industry and other purposes. The conversion of salty water to fresh water is expensive, costing more than 10 times the highest cost of irrigation water or 4 times the average cost of municipal water in 400 American cities.[15] However, eventually the cost can be reduced through technical and other improvements.

[11] Kohler, Jr., *op. cit.*, p. 38.

[12] S. A. Changnon, "Survey of Illinois Water Supply Problems with Special Reference to Charleston," *Illinois Academy of Science Transaction*, 45 (1952), 73.

[13] *Ibid.*

[14] *The New York Times*, June 5, 1960, p. 6.

[15] D. S. Jenkins and others, "Conversion of Saline Water," *The Yearbook of Agriculture, 1955, Water*, p. 112.

MAGIC MAP*

JAMES GOBLE
The Courier-Journal

IT WAS A race on foot from New York to California for Patricia Draughon and Stephen Marsh, a couple of Louisville youngsters who need crutches to walk.

Stephen quickly took the lead. He was across the Mississippi River while Patricia was still in Ohio. In no time at all he was in Nevada. He thrust his crutches forward in a final effort and swung into California.

He had made it from New York in less than 10 seconds!

Magic crutches?

No, sir, but there's something akin to magic in the huge map that Stephen and Patricia walked across on the asphalt playground of the Ellen C. Semple School at 724 Denmark (Fig. 1). It teaches geography in many ways to all grades at the elementary school, including the special Crippled Children's Class, to which Stephen and Patricia belong.

Billy Bogard, a First Grader, can stand in Kentucky, slowly pivot, and see every bordering state.

Rebecca Ann Fentress, a Fourth Grader, can stand at the top of the map and see the major waters that border the nation, the Atlantic and Pacific Oceans, the Gulf of Mexico and the Great Lakes.

David Alan Trabue, another Fourth Grader, can sit in Texas and find he has room a-plenty. But if he sits in the New England area, he will cover two or three states.

David Plato, a Fifth Grader, can join other pupils in a new version of hopscotch. They can hop from one state to another, always keeping a wary eye out for Kansas. If a foot touches that state, oops, the player is out.

It's one of the simplest—yet most ingenious—training aids at the school. It teaches the pupils something of the size, shape and location of states, even while they're playing. They can't even walk across the map without realizing that Indiana is between Ohio and Illinois.

Outline Map

The big map is a scale model, measuring about 30 by 20 feet, much larger than the floor of the ordinary living room. The border of each state is shown by yellow paint. Names or abbreviations for each state are also shown.

Only recently completed, the map is the brain child of Irvin Goldstein, one of the Fifth Grade teachers at the school. He dreamed it up as an aid in teaching arithmetic, of all things. Goldstein felt that it would help his pupils understand scale drawings and ratios.

His class started work on the map last October. First there had to be a pattern for each state, showing each zig and zag along its borders. And all the states had to be to scale if they were to fit the playground space selected for the map.

The pupils discovered each state would have to be six times as large as it was on the wall map in their classroom. They learned the wall map had a scale of 50 miles to the inch. Things got a little complicated while they divided, computed and compared to determine the scale of the playground map. The pupils finally hit on a scale of eight and a third miles to the inch.

Three or four cardboard cut-outs of states were made weekly by Goldstein's class. Each was the size needed for the playground map.

Earlier, tracings of these three or four states had been made from the wall map. Rectangles were drawn around the tracings, and each was divided by horizontal

* This article first appeared in the January 22, 1961 issue of *The Courier-Journal Magazine*. It is re-published by courtesy of Mark Ethridge, publisher.

FIG. 1. Members of a special class at Semple School, Stephen Marsh and Patricia Draughon "race" across the big scale model map of the United States drawn on the playground. It was made by a class of Fifth Graders (Courtesy of *The Courier-Journal*).

and perpendicular lines into fourths, eighths and even sixteenths, depending on the size of the state.

Then the drawing was transferred in projected form to the cardboard, similarly marked by horizontal and perpendicular lines, but enclosing areas six times as large as those on the tracing.

FIG. 2. David Plato uses a compass to check on map's orientation. With him is his teacher, Irvin Goldstein, who supervised the making of the map (Courtesy of *The Courier-Journal*).

The pupils got a lot of fun and learning out of the cardboard cut-outs long before all 48 were created. They could pick up separate states and compare their size. Or they could use several as a giant jigsaw set, putting the pieces on the floor in proper order and making sure they fit snugly along the borders.

Then came the day all 48 cut-outs were laid on the playground, oriented to magnetic north. Each state was slightly separated from its neighbors so that chalk lines could be drawn around it. After the cut-outs were removed, the chalk lines were given a coat of paint. Next, names of states were painted in—

and, presto, the map was made (Fig. 2).

It's flat, of course, for safety's sake, like the rest of the playground. There are no humps to resemble mountains. Besides, what mother would believe a daughter who came home with a skinned knee and reported she fell over Pikes Peak!

CHECKING MAP-READING SKILLS IN THE ELEMENTARY GRADES

EDNA CHRISTOPHEL
State College of Iowa, Cedar Falls

MAPS AND GLOBES show the locations, arrangements, and distribution of selected physical and cultural features in the environment. They are aids to learning, and sometimes they are the only means by which certain facts can be presented.

Map-reading skills and abilities are developed gradually. Constant practice, frequent review, and re-teaching are necessary. Instruction in the use of maps and globes should be given at the time when the pupils need to use them for a specific purpose; it should be correlated with the work that the pupils are doing in the social studies area or in geography classes.

Using Maps and Globes

It is essential to check frequently on the progress which the pupils are making in using maps and globes. In general, there are three ways by which they may be checked on their map-reading skills:

1. Let the pupils answer the questions orally, by going directly to the globe or maps.
2. Have the pupils write the answers to the questions, using the globe, the wall maps, or the maps in their books.
3. Make use of worksheets, which have both the maps and the questions.

The first method will no doubt be used most frequently, and perhaps has the most value. However, it is essential to check on the abilities of individual pupils from time to time, and the second method provides a good way. The third method may be used for diagnostic purposes.

The following questions are illustrative of those which might be used when the pupils are working directly with globes and/or maps by either answering the questions orally or writing the answers:

A. Checking the legend on the map:
   1. What is the scale of miles?
   2. What do the colors mean?
   3. What do the symbols mean?
   4. Are other facts given?

B. Finding one example of each of the following features on the map:

1. plain	4. ocean	7. isthmus
2. desert	5. island	8. tributary
3. mountain	6. peninsula	9. continent

C. Observing South America:
   1. In what direction is South America from North America?
   2. Which is larger, South America or North America?
   3. Name the A-B-C countries.
   4. What are three large bodies of water that border on South America?
   5. Through what part of South America does the equator pass?
   6. Find a strait in the southern part of the continent. What bodies of water does it connect?
   7. Name the cape at the southern tip of South America?
   8. What large range of mountains extend the full length of this continent from north to south? Where are they located?
   9. In which country is each of these cities located?

Rio de Janeiro	Belem	La Paz
Santiago	Buenos Aires	Caracas

Map Worksheets

These are two examples of ways in which worksheets may be used to check map-reading skills.

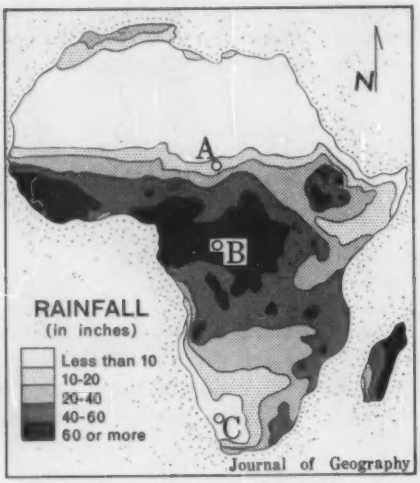

FIG. 1

By referring to Figure 1 showing the rainfall of a continent, underline the correct answer or fill in the blank.

1. (Most, about half, much less than half) of this area receives over 60 inches of rainfall.
2. (Most, about half, little) of this area receives less than 20 inches of rainfall.
3. The (northern, middle, southern) part of this area receives the least amount of rainfall.
4. The (northern, middle, southern) part of this area receives the greatest amount of rainfall.
5. City (A, B, C) is found in a desert region.
6. City (A, B, C) is found in a region which is likely to have many rivers and lakes.
7. Deserts are found (north and south, east and west, north only) of City B.
8. City (A, B, C) is most likely to have enough rainfall to grow rice.
9. Large numbers of people are most likely to live in the region near City (A, B, C).
10. City (A, B, C) might be in a region of many trees and perhaps tropical jungle.
11. This area represents a continent. It is _____.

By referring to Figure 2 showing Ireland, fill in the blanks.

Which letter on the map is near a:

1. peninsula _____
2. lake _____
3. delta _____
4. island _____
5. river _____
6. bay _____
7. capital city _____
8. seaport city _____
9. city (not a seaport) _____
10. boundary _____

Complete these sentences by writing the proper direction:

1. The river flow _____.
2. The capital city is _____ of B.
3. To go from C to H we would travel _____.
4. To go from A to H we would travel _____.

A few precautions concerning these examples should perhaps be considered. First of all, the questions or exercises must be adapted to both the grade level of the pupils and the material which they are studying. Secondly, since these are examples of ways to check map-reading skills, they contain fewer items than the teacher may wish to use.

Some References

The following professional books also contain many good suggestions on map-reading skills:

Harris, Ruby, M., *The Rand McNally Handbook of Maps and Globe Usage*. Rand McNally and and Co., Chicago, 1959.

FIG. 2

Jarolimek, John, *Social Studies in Elementary Education*. The Macmillan Co., New York, 1959.

Michaelis, John U., *Social Studies for Children in a Democracy*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1956.

National Council for the Social Studies, *New Viewpoints in Geography*. The Council, Washington, D.C., 1959.

——, *Skills in Social Studies*. The Council, Washington, D.C., 1954.

Preston, Ralph C., *Teaching Social Studies in the Elementary School*. Rinehart and Co., Inc., New York, 1958.

Thralls, Zoe A., *The Teaching of Geography*. Appleton-Century-Crofts, Inc., New York, 1958.

Tiegs, Ernest W. and Adams, Fay, *Teaching the Social Studies*. Ginn and Co., Chicago, 1959.

NATIONAL COUNCIL AT WORK

Report of the Secretary

NCGE Membership. During the past academic year, membership in the National Council for Geographic Education increased as did subscriptions to THE JOURNAL OF GEOGRAPHY. There are members in all of the 50 states except Wyoming, in 6 of Canada's provinces, and in the countries of Cuba, Sweden, Australia, Bolivia, Brazil, Switzerland, Colombia, Singapore, Spain, England, Poland, Puerto Rico, France, Finland, Germany, Hong Kong, India, Israel, Japan, South Korea, Union of South Africa, Philippines, Lebanon, Mexico, Nepal, New Zealand, Netherlands, Norway, Pakistan, Peru, Thailand, and Venezuela. Subscriptions to THE JOURNAL OF GEOGRAPHY extend the work of the Council to additional foreign countries.

In the United States an interesting three-state race for membership lead is taking place. Pennsylvania continues to lead in total membership with Illinois a *very* close second and gaining. New York is in third place close behind Pennsylvania and Illinois. California is fourth in total membership.

The most encouraging development in membership has been the increase in numbers of contributing members this year as compared to last year. Last year at the time of the November Annual Convention of the Council, there were 89 contributing members. This number will be exceeded by the next Convention since by mid-summer, 1961, there were already 105 contributing members. The funds from contributing memberships are used to finance the publications of the Council other than THE JOURNAL OF GEOGRAPHY.

The total number of Fellows in the Council has increased with the addition of 33 new Fellows during 1960. To be a Fellow, a member must have been in good standing for five consecutive years.

New NCGE Student Memberships. By action of the Executive Board, the new category of Student Membership was made effective September 1, 1960. Student membership in the NCGE includes subscription to THE JOURNAL OF GEOGRAPHY and receipt of all newsletters and notices of the Council. Student members are eligible to attend the General Assembly at the annual meeting as non-voting participants. Annual dues are $3.00. Application must include signature of a teacher in the student's school. The members of the Council and others in the field of geography were notified of this new membership category by the following actions: the Editor of THE JOURNAL OF GEOGRAPHY included appropriate notices, applications were sent to each state coordinator, applications were sent to every chapter of Gamma Theta Upsilon, and applications accompanied by an NCGE bulletin board poster were sent to every department of geography in the United States. Also included with this poster and student membership application sent to every department were materials about the Council and regular membership applications. By mid-summer, 1961, there were over 100 memberships.

Fiscal Actions of the Executive Board. The types and costs of memberships in the Council have been reviewed by the Board with the following actions resulting: (1) addition of a new student membership of $3.00; (2) increase of regular dues to $5.00, effective January 1, 1961; (3) continuance of contributing membership at $10.00 per annum. The increased costs of printing and postage, along with greater publication and professional activity of the Council made the dues revision necessary.

New NCGE Program of Student Awards. The Executive Board at its meeting in November, 1960, acting upon recommendations of the Planning Committee, established a policy of NCGE recognition of outstanding students in geography. The Secretary sent a letter to the chairman of each department where a major in geography is offered announcing that a recognition certificate would be offered to outstanding students majoring in geography. The award is to be made only where a major is offered in a department; the award is to be made to those selected by the various departments; the responsibility for screening of candidates will be departmental and not that of the Council; the nominees are to be undergraduate seniors. All departments were notified in the spring of 1961, and 26 institutions have submitted names for the Board's consideration. Upon official accept-

ance of these names, the nominees will be awarded certificates, will be appropriately recognized in THE JOURNAL OF GEOGRAPHY, will be invited to the annual meeting to be held next November in Philadelphia, and will have their names appear on the official program of that meeting. The institutions submitting nominees were: Hastings College, Nebraska; Wellesley College, Massachusetts; Nebraska State Teachers College, Chadron; The University of Nebraska, Lincoln; Central Michigan University, Mt. Pleasant; State University College of Education, Cortland, New York; Montclair State College, New Jersey; Chico State College, California; Mansfield State College, Pennsylvania; Carroll College, Wisconsin; Trenton State College, New Jersey; State Teachers College at Towson, Maryland; State Teachers College, Edinboro, Pennsylvania; State Teachers College, Slippery Rock, Pennsylvania; State College, California, Pennsylvania; Michigan State University, East Lansing; Western Illinois University, Macomb; The University of Oklahoma, Norman; University of Minnesota, Minneapolis; Indiana State College, Indiana, Pennsylvania; The University of Michigan, Ann Arbor; De Paul University, Illinois; San Diego State College, California; Arizona State University, Tempe; University of Missouri, Columbia; Montana State College, Bozeman.

NCGE Publications. The Publications Center of the NCGE serves as the place of publication of materials other than THE JOURNAL OF GEOGRAPHY and is responsible for materials distribution. Many new publications have appeared and many are in preparation. All members, upon renewal of membership, receive one of the newer publications of the NCGE. A list of all publications and their cost can be obtained from: NCGE Publications Center, Box 303, Faculty Exchange, Norman, Oklahoma.

Past Convention—1960. The 46th Annual Meeting was held at Cincinnati, Ohio, on November 25-26, 1960. The Program Chairman was President John W. Morris, Local Arrangements Chairman was John W. Coulter, with the Secretary responsible for Convention arrangements. The exhibit area was well attended and included geographic materials from 18 different publishers. Some of the papers of the Convention have appeared as professional papers of the NCGE Publications Center. The Distinguished Service Award recipient was reported in the December, 1960 issue of THE JOURNAL OF GEOGRAPHY. William H. Hessler of the *Cincinnati Enquirer* received the "Award for Geography Writing in a Non-Geographic Publication," for his article in the *U. S. Naval Institute Proceedings*, December, 1959.

1961 NCGE Convention. The 47th Annual Meeting of the NCGE will be held in Philadelphia, Pennsylvania, at the Benjamin Franklin Hotel on November 24-25, 1961. President Jewell Phelps is Program Chairman, Co-chairmen of Local Arrangements are George Langdon and Alvin S. Keinard of State Teachers College, West Chester, Pennsylvania. Mr. John Bonham is in charge of field trip arrangements. A very interesting program has been arranged and the field trips will involve not only guided tours of special interest to geography teachers, but also will include materials so that those in attendance can conduct personal "do-it-yourself" field trips. In late October, all members will receive from the Secretary complete details about the Convention, field trips, reservations, etc. (Practical note: *all* expenses incurred by educators in attending professional meetings are deductible for income tax purposes.)

Lorrin Kennamer, Secretary

GEOGRAPHIC MATERIALS RECEIVED

International Labor Office. **International Migration, 1945-1957.** International Labor Office, Washington Branch, 917 15th Street, N.W., Washington 5, D.C., 1960. 414 pages. $4.00.

S. W. Wooldridge and R. S. Morgan. **An Outline of Geomorphology.** Longmans, Green & Company, Inc., 119 West 40th Street, New York 18, New York, 1959. 409 pages with table of contents, list of illustrations, etc., and index. $6.50.

T. C. Fairley, **Sverdrup's Arctic Adventures.** Longmans, Green & Company, Inc., 119 West 40th Street, New York 18, New York, 1960. 305 pages with table of contents, illustrations, and index. $6.00. Adult.

Arthur H. Robinson. **Elements of Cartography.** John Wiley & Sons, Inc., Publishers, New York, 1960. 343 pages with index, table of contents, illustrations. $8.75.

W. Gordon East and O.H.K. Spate. **The Changing Map of Asia.** E. P. Dutton and Company, Inc., 300 Fourth Avenue, New York City, New York, 1958. 434 pages with table of contents, introduction, index. Illustrated. $6.50.

Harold D. Drummond and Fred A. Sloan, Jr. **The Eastern Hemisphere.** Allyn and Bacon, Inc., 150 Tremont St., Boston 11, Mass., 1961. 416 pages including table of contents, appendix, index. (Teachers edition). $5.20.

J. W. Powell. **The Exploration of the Colorado River and Its Canyons.** Dover Publications, Inc., 180 Varick Street. New York 14, N.Y., 1961. 400 pages including list of illustrations and index. $2.00.

M. A. Barker-Benfield. **The Lands and Peoples of East Africa.** The Macmillan Company, 60 Fifth Ave., New York 11, N.Y., 1960. 104 pages including 21 photographs and one map. $1.75.

Pierre Gourou. **The Tropical World, Its Social**

and Economic Conditions and Its Future Status (translated by E. D. Laborde). Longmans, Green & Co., 119 W. 40th St., New York 18, N.Y., 1961. 159 pages including maps, photographs and index. $4.25.

William Ashley Anderson. **Angel of Hudson Bay.** E. P. Dutton and Co., 300 Park Avenue South, New York 10, N.Y., 1961. 217 pages including illustrations. $4.50.

Olive L. Earle. **Camels and Llamas.** William Morrow and Co., Inc., 425 Fourth Avenue, New York 16, N.Y., 1961. 64 pages with illustrations. $2.75.

Jens Bjerre. **Kalahari.** (translated by Estrid Bannister). Hill and Wang, 104 5th Avenue, New York 11, N.Y., 1960. 227 pages including color photographs, black and white photographs. $4.50.

Edwin Thompson Denig. **Five Indian Tribes of the Upper Missouri, Sioux, Arickaras, Assiniboines, Crees, Crows.** (Edited and with an introduction by John C. Ewers). University of Oklahoma Press, Norman, Oklahoma, 1961. 217 pages including a map, illustrations, editors bibliography and index. $4.00.

ETV: A Ford Foundation Pictorial Report. The Ford Foundation, 477 Madison Ave., New York 22, N.Y., 1961. 68 pages with illustrations. Copies free upon request.

Richard G. Ray. **Aerial Photographs in Geologic Interpretation and Mapping.** Geological Survey Professional Paper 373, United States Government Printing Office, Washington 25, D.C., 1960. 230 pages including illustrations, references cited and index. $2.00, paper cover.

Robert H. Fletcher. **Free Grass to Fences: The Montana Cattle Range Story.** University Publishers Inc., 59 East 54th St., New York 22, N.Y., 1961. 233 pages with 62 illustrations by Charles M. Russell. $12.00.

Sigurd F. Olson. **The Lonely Land.** Alfred A. Knopf, 501 Madison Ave., New York 22, N.Y., 1961. 273 pages with illustrations. $4.50.

O. D. von Engeln. **The Finger Lakes Region: Its Origin and Nature.** Cornell University Press, 124 Roberts Place, Ithaca, N.Y., 1961. 156 pages including illustrations, drawings, glossary and index. $4.50.

S. V. Utechin. **Everyman's Concise Encyclopaedia of Russia.** E. P. Dutton and Co., Inc., 300 Park Avenue South, New York 10, N.Y., 1961. 623 pages including illustrations, systematic list of entries. $7.95.

Donald Culross Peattie. **Flowering Earth.** The Viking Press, Inc., 625 Madison Avenue, New York 22, N.Y., 1961. 252 pages. $1.45 paperback.

C. P. Friedlander. **Heathland Ecology.** Harvard University Press, Cambridge, Mass., 1961. 94 pages including list of figures, notes for teachers, book list, general index and index of genera. $1.75.

Elizabeth K. Cooper. **Science on the Shores and Banks.** Harcourt, Brace & Co., 750 Third Ave., New York 17, N.Y., 1960. 187 pages with Illustrations. $3.25.

Elizabeth Coatsworth. **Desert Dan.** The Viking Press, Inc., 625 Madison Ave., New York, N.Y., 1960. 64 pages with illustrations. $2.50.

Datus C. Smith, Jr. **The Land and People of Indonesia.** J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pa., 1961. 125 pages with photographs and index. $2.95.

Sonia Bleeker. **The Maya Indians of Central America.** William Morrow and Co., 425 Park Avenue South, New York 16, N.Y., 1961. 160 pages with illustrations. $2.75.

Irving Werstein. **The Blizzard of '88.** Thomas Y. Crowell Co., 432 Park Avenue South, New York 16, N.Y., 1960. 157 pages with photographs and illustrations. $4.50.

Arthur C. Clarke. **The Challenge of the Sea.** Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York 17, N.Y., 1960. 167 pages including illustrations, index and introduction by Wernher von Braun. $3.95.

Phillip O. Foss. **Politics and Grass: The Administration of Grazing on the Public Domain.** University of Washington Press, Seattle 5, Wash., 1960. 236 pages including appendix, notes, bibliography and index. $4.50.

Adrian Cowell. **The Heart of the Forest.** Alfred A. Knopf, 501 Madison Ave., New York 22, N.Y., 1961. 238 pages with 39 photographs and 3 maps. $5.00.

Carleton Mabee. **The Seaway Story.** The Macmillan Company, 60 Fifth Ave., New York 11, N.Y., 1961. 301 pages with illustrations, maps, notes, index. $5.95.

Jane and Paul Annixter. **Horns of Plenty.** Holiday House, 8 West 13th St., New York 11, N.Y., 1960. 203 pages. $2.95.

Gilbert F. White, Editor. **Papers on Flood Problems.** Department of Geography Research Paper No. 70, University of Chicago, 5801 Ellis Ave., Chicago 37, Illinois, 1961. 228 pages with illustrations. No price listed.

Samuel Everett, Editor. **Programs for the Gifted: A Case Book in Secondary Education.** The Fifteenth Yearbook of the John Dewey Society, Harper & Brothers, 49 E. 33rd St., New York 16, N.Y., 1961. 299 pages. $5.50.

Russell Davis and Brent Ashabranner. **Ten Thousand Desert Swords.** Little, Brown and Co., 34 Beacon St., Boston 6, Mass., 1960. 158 pages including illustrations, glossary of terms. $3.50.

Sheila Burnford. **The Incredible Journey.** Little, Brown and Co., 34 Beacon St., Boston 6, Mass., 1961. 145 pages with illustrations. $3.75.

Van Nostrand Atlas of the World. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N.J., 1961. 240 pages with photographs, colored maps. .98 (paperback).

Charlotte Jackson. **The Key to San Francisco.** J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pa., 1961. 128 pages with photographs and illustrations. $2.95.

Lucia Carolyn Harrison. **Sun, Earth, Time and Man.** Rand McNally & Co., P.O. Box 7600, Chicago 80, Illinois, 1960. 287 pages with tables, figures, maps and index. $4.50.

William D. Allen. **Africa.** The Fideler Company, Grand Rapids 2, Michigan, 1961. 160 pages with 146 photographs and maps, glossary and index. 1-4 copies $3.68 per copy; 5 or more copies $2.76 per copy.

Lewis Mumford. **The City in History.** Harcourt, Brace & World, Inc., 750 Third Avenue, New York 17, N.Y., 1961. 657 pages with illustrations, bibliography and index. $11.50.

Hans Jenny. **E. W. Hilgard and the Birth of Modern Soil Science.** Farallon Publications, Box 564, Berkeley, Calif., 1961. 144 pages. $2.00.

J. Oliver Thomson. **Everyman's Classical Atlas.** E. P. Dutton & Co., Inc., 300 Park Avenue South, New York 10, New York, 1961. 195 pages with figures, maps and photographs. $5.00.

John Bartholomew. **World Atlas.** Simmons-Boardman Books, 30 Church Street, New York 7, New York, 1960. 112 pages, including the general index. $2.75.

F. K. Exell. **The Land and People of Thailand.** The Macmillan Company, 60 Fifth Avenue, New York 11, New York, 1960. 96 pages, including the table of contents, photographs, maps, and index. $1.75.

Rhoads Murphey. **An Introduction to Geography.** College Department Rand McNally & Company, P.O. Box 7600, Chicago 80, Illinois, 1961. 699 pages including table of contents, maps, figures, tables, statistical appendix, and index. $7.75.

Charles T. Clark. **Recreational Boating in Texas.** Bureau of Business Research, College of Business Administration, The University of Texas, Austin, Texas, 1961. 53 pages with table of contents, tables, figures, and appendix. $1.00.

Robert H. Ryan. **Corpus Christi: Area Resources for Industry.** Bureau of Business Research, College of Business Administration, The University of Texas, Austin, Texas, 1961. 369 pages including table of contents, plates, figures, and tables. $3.00.

G. L. Reuber and R. J. Wonnacott. **The Cost of Capital in Canada—with Special Reference to Public Development of the Columbia River.** Resources for the Future, Inc., 1775 Massachusetts Avenue, N.W., Washington 6, D.C., 1961. 101 pages including table of contents, charts, tables, figures, and appendices. $1.50.

Lowdon Wingo, Jr. **Transportation and Urban Land.** Resources for the Future, Inc., 1775 Massachusetts Avenue, N.W., Washington 6, D.C., 1961. 132 pages with table of contents, figures, and appendices. $2.00.

U.S. Department of Health, Education, and Welfare: Public Health Service. **Proceedings: The National Conference on Water Pollution** (Publication No. 819). U.S. Government Printing Office, Washington 25, D.C., 1961. 607 pages with table of contents, tables, figures, one map, and appendices. $2.25.

Val Gendron. **The Dragon Tree.** Longmans, Green & Co., Inc., 119 West 40th Street, New York 18, N.Y., 1961. 214 pages with contents, plates, biblography, and index. $3.95.

D. D. Harris and D. A. M. Lea. **A Regional Geography of South Australia.** Whitcombe & Tombs Pty. Ltd., 20 Bond Street, Melbourne, C. 1, Australia, 1961. 168 pages, including table of contents, maps, diagrams, and index. About $2.75.

Loyal Durand, Jr. **Economic Geography.** Thomas Y. Crowell Company, 432 Park Avenue South, New York 16, N.Y., 1961. 578 pages including table of contents, maps, illustrations, and index. $7.25.

BOOK REVIEWS

Ralph and Mollie Izzard. **A Walk in the Mountains, A Family's Trip Through the High Lebanon.** David McKay Co., Inc., 119 W. 40th St., New York 18, N.Y., 1960. 253 pages. $4.95.

Something definitely different in travel books is this account of a British family's three-month trek in the Republic of Lebanon. The party consisted of the authors, their sons aged nine and four, and daughters eight and six, their Lebanese major-domo, and three donkeys.

The route included the coastal plain and the interior valley of the Beka's, but most of the time was spent traversing the slopes of "the mountain" from which the country takes its name. The style of writing is easy and matter-of-fact, and the story derives its charm from the rich variety of the inhabitants and the scenery.

The Lebanon long has been a refuge area, and its population consists of many jealously independent groups including Orthodox Greeks, Catholics of the Latin, Maronite and Greek rites, Shiia and Suni Moslems, and the Druses. Most of the story is devoted to encounters with farmers, cameleers, sheep and goat herders, monks, tourists, hashhish smugglers, resort operators, gendarmes, outlaws, and feuding mountaineers. There are descriptions of grain fields, orchards, vineyards, olive groves, highland pastures, the famous cedars, monasteries, ruins and resorts. Numerous references are made to the Phoenicians, Assyrians, Romans, Greeks, Normans, Turks and French whose passage has made much of Lebanese history.

This is an enjoyable book, and it will be particularly interesting to those who believe in getting off the beaten path and meeting the local people on their own ground.

ALBERT J. P. MCCARTHY
Indiana University

Wesley Calef. **Private Grazing and Public Lands, Studies of the Local Management of the Tay-**

lor Grazing Act. The University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Ill., 1960. 292 pages with foreword, table of contents, index, maps, photographs, and author's notes. $9.50.

Although chiefly concerned with the use and management of the "vacant, unappropriated, unreserved lands" of the public domain, this volume is an excellent treatise on the geography of the western range livestock industry. Three chapters are devoted to background considerations of the character of western land resources, the organization and methods of ranching operations, and the pattern and role of land tenure. These are followed by one chapter that appraises the Taylor Grazing Act and its administration.

After focusing on the main themes of the book—the questions of how well has the Taylor Grazing Act worked and what can be done to improve it—attention is then turned to a detailed analysis of the range livestock industries of the Middle Rocky Mountain Basins (six chapters). In total, illustrations are provided for the varied conditions of range types, ranching operations, land tenure, and range administration and management. The final chapter summarizes findings and presents recommendations for the improvement of management and administration of the public range.

In the opinion of this reviewer the book provides an excellent, unbiased penetrating, and balanced analysis of Taylor Grazing Lands administration. It demonstrates nicely the values of the geographer's integrative point of view and method as applied to practical problems relative to man and land. The study draws heavily upon personal experiences and contains much detail in the form of case studies not found in any other single volume. It is commended to all who have interest in either the range livestock industry or the western states in general.

RICHARD M. HIGHSMITH, JR.
Oregon State University

S. H. Steinberg (editor). **The Statesman's Yearbook, 1960-1961.** St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N.Y., 1961. Pages i-xxvi; 1-1677. $9.50.

The Statesman's Yearbook is a comprehensive volume of up-to-date statistical and descriptive material valuable to teachers, students, and others seeking a good reference.

In the front is a map of Singapore and Federation of Malaya, in the back is a map of World Refugee Year, 1959-1960.

Pages vii-xxvi include a Table of Contents; ten tables giving area and quantity of production by important countries for wheat, rye, barley, oats, maize, rice, potatoes, sugar, cotton, and petroleum; and a table, "Life Insurance," for 32 countries.

Pages 1-1677 are divided into four parts. Part I includes a discussion of the United Nations and thirteen related agencies. Also, fourteen other International Organizations are discussed.

Part II, 572 pages, deals with the British Commonwealth and Empire. It presents a short description of the composition of The British Commonwealth, followed by a somewhat encyclopedic description of the components of the Empire under such headings as Constitution and Government; Area and Population; Religion; Education; Court Systems; Insurance; Pensions; Assistance and Welfare; Finances; Defence; Agriculture; Fisheries; Fuel and Power; Labour and Employment; Commerce and Communications.

Part III, 218 pages, treats the United States and possessions in a manner similar to The British Commonwealth.

Part IV devotes 781 pages to Other Countries under headings similar to Part II. Their territorial possessions are likewise discussed.

Very helpful to the user is the inclusion of a list of references at the end of each part and a one hundred page index.

CYRIL L. STOUT
Western Michigan University

E. Joseph Dreany. **Alaska.** Maxton Publishers, 15 E. 26th Street, New York 10, N.Y., 1959. 28 pages with 40 pictures, and one map. $1.38.

This small book of 28 pages attempts to treat Alaska with approximately 4000 words of textual material covering 17 units or topics. In addition there are 40 pictures (some in color) all of which are the product of some artist; one map serves as a frontispiece.

The units or topics covered are as follows: Seward's Icebox; On the Trail of Gold; Sheldon Jackson and the Reindeer; Sealing; The Great Fishing Industry; Mining Methods Today; Timber Resources; Water Power; Trapping and Fur Farming; The Sportsman's Paradise; Climate; The Call to Adventure; People of Alaska; Farming in Alaska; The Alaskan Highway; Cities of Alaska; and the Future of Alaska. Since the topics average roughly 235 words each there results the barest of treatment. For example, only eight lines are devoted to the water power resources.

This book will be of value to children, and to adults who know nothing about Alaska and who prefer brevity of treatment rather than completeness.

FLOYD F. CUNNINGHAM
Southern Illinois University

John C. and Elsie F. Caldwell. **Our Neighbors in Japan.** The John Day Company, Inc., 62 West 45th Street, New York 36, New York. 47 pages. Illustrated. Trade edition $2.00, Library edition $2.21.

Our Neighbors in Japan is a simple story of the country of Japan and its people written for the six- to nine-year old audience. It tells of the weather, the mountains and volcanoes, the houses and furniture, meals and clothes and schools and churches. The text is woven around

the pictures which appear on nearly every page. The vocabulary used has been selected and tested by second- and third-grade classroom teachers. The child reader's interest will be heightened by the inclusion of several photographs featuring the authors' children in the Japanese setting.

The Caldwells are well acquainted with the Far East. He was born in China and she in Korea, and both have traveled in Japan many times. Unfortunately, in the attempt to key the text to photographs the resultant story frequently lacks continuity. Space limitations imposed upon the length of the text because of the inclusion of a large number of photographs results in an inadequate treatment, or the actual omission, of several important aspects of Japanese life, *e.g.*, agriculture, land limitations, transportation, etc. The several pages devoted to the explanation and/or apology of the 1941-1945 Japanese-United States conflict seems to over-emphasize these events, particularly to the maturing young minds.

FREDERICK L. WERNSTEDT
The Pennsylvania State College

R. J. Harrison Church. **West Africa: A Study of the Environment and of Man's Use of it.** Longmans, Green and Company, 119 West 40th Street, New York 18, N.Y. Second Edition, 1960. xxvii and 547 pages with photographs, maps and index. $10.00.

It is always gratifying to see a good book enjoy the success it deserves. Dr. Church's *West Africa* was widely acclaimed on publication in 1957 as the best work on the subject, and has been selling well ever since. It has also been translated into Russian and Arabic. The new edition follows the lines of the first: that is, it starts with the physical geography and the resources (human and economic) of the region as a whole, and then deals with the geography of the individual territories. However, the text has been revised at many points where political and other changes have demanded it; and an earnest, if not always successful, attempt has been made to update the statistical material. The only change with which we would wish to quarrel is the increase in price, for this is a book that no high school or college library should be without.

GEORGE H. T. KIMBLE
Indiana University

Alex Somme, editor. **A Geography of Norden.** John Wiley & Sons, 440 Fourth St., New York 16, N.Y., 1960. 363 pages including table of contents, 200 descriptive maps, diagrams and illustrations, selected bibliography and place name index. Aproximately $7.50.

This work is more than a textbook; it is a concise compendium of material essential to an understanding of the people as well as of the countries of northern Europe. The articles dealing with the concept of *Norden* as a geographic entity have been written by Professor Fridtjov Isachsen and serve as an introduction to the work as a whole. In this introduction the term, Norden, is defined, the physical aspects are treated, and it includes also a historical survey of the political frontiers between Norden and the surrounding countries, Russia and Germany.

The first eight chapters deal with the aspects of physical geography which the Norden countries have in common, such as surrounding seas, geological and morphological features, climate, plant geography regions, population and settlement, and natural resources and their uses. Specific areas and types are stated in commendable and convincing fashion, always with full credit to the sources of data. This section of the book should be of special interest to all Americans who are interested in building for themselves a true image of Scandinavia and its importance as a factor in American culture.

The summaries of production of commodities by kinds and countries are noteworthy because they made it possible for the inquiring reader to see the view as a whole and in such detail regarding principal products as he may desire. This is a phase of economic geography that might well be more broadly applied in many American publications.

The major part of the book, about 262 pages, is devoted to a treatment of the separate countries written by Scandinavian geographers of recognized high standing, many of world-wide fame. The amount of space given to each is sufficient to permit effective presentation and in all cases is ably done. In sequence Denmark comes first and Sweden is used as the final country in the line of discussion. Maps to show regional characteristics are used liberally throughout the discussion, mostly in black and white which in connection with the full page color maps and the large photo-cuts, enable readers to visualize the physical features and the distribution patterns of each country. While the work as a whole follows a common pattern of physical features, landscapes, and industrial activities, the individual authors have effectively stated their stories for the several countries in scholarly manner without any district trend toward monotony.

The little-known parts of some countries such as Greenland, the Faero Islands, and Bornholm for Denmark, and Spitsbergen for Norway are given deserved attention, a feature that will surely be appreciated by all geographers in the United States. In the opinion of the reviewer, the discussion of Finland is especially effective in emphasizing the interplay of cultures from the east and the west together with wedges of influence from the north and the south. Another aspect that deserves special attention is that the book as a whole shows unity of treatment midst diversities of physical, industrial, and cultural conditions, all without overplay of scenic features and historical factors, none omitted but none overdone.

NELS A. BENGSTON
University of Nebraska

BOOK REVIEWS

Robert H. Fletcher. **Free Grass to Fences: The Montana Cattle Range Story.** University Publishers Inc., 59 East 54th St., New York 22, N.Y., 1961. 233 pages with 62 illustrations by Charles M. Russell. $12.00.

Free Grass to Fences is essentially a narrative history of the Montana commercial range livestock industry from its founding in the 1860's to the present. We tend to visualize the range cattle rancher as living in splendid isolation on a vast empty range land and having to contend only with the vicissitudes of nature. Quite the opposite is the case; commercial cattle ranchers are, of course, closely associated and involved with the general commercial life of the nation.

Montana's range livestock industry was founded to supply the early mining camps, and the earliest ranches were located in the western mountain valley adjacent to the camps. With the completion of the Union Pacific Railroad, ranching moved eastward into the Great Plains, and the cattle were trailed a hundred or more miles to that rail connection to eastern markets. When the northern transcontinental rail lines were completed marketing costs declined, but the controversy over rail rates between the ranchers and the railroads continued for more than a half-century. Industrial prosperity affected the ranchers (who sell in a commercial market) favorably; bad times had equally adverse effects. The policy of the federal government with respect to its range land, which comprises more than half the total range land in vast sections of Montana, also had important impacts on ranching as a business. To deal with the multifarious problems of raising, transporting, and marketing range cattle, the ranchers have formed livestock growers associations—local, state, and national. Much of the volume concerns the history of the Montana State Livestock Association.

Books, like people, must be accepted as a package, their favorable aspects with their unfavorable. *Free Grass to Fences* contains a great deal of historical material of interest and importance on the Montana range livestock industry; some of it is available nowhere else. It also contains a good deal more that is dubious and speculative, or is little more than sheer gossip. The organization is extremely loose; the author permits himself long digressions at any point where free association suggests them. The style tends to be "folksy." The illustrations are excellent. The author has included sixty-two of the fine drawings and paintings by Charles M. Russell and numerous superb old photos of the authentic range livestock industry, ranchers, their appurtenances and dwelling places. For this reviewer they are the outstanding feature of the book.

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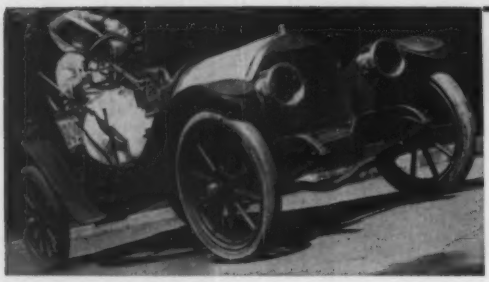

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BOOK REVIEWS

Inez Hogan. **Little Lost Bear.** Dutton & Co., 300 Fourth Avenue, New York 10, N.Y., 1960, 38 pages. $2.50.

Little Lost Bear by Inez Hogan, if we take the title of the book at face value, is a story of a little bear who learns he needs his mother—first when he follows a rabbit to see his home and gets lost and later when he stays at home to play in the tree and a wolf appears. It states some rules of safety: "Do not wander far away. Stay nearby the tree and play." And when Cubby disobeys, he gets lost. While he is lost, a turtle suggests that he stay in one place and call for his mother so she can find him.

The latter two-thirds of the book centers around homes of animals. This would seem to be the major theme and should have been developed in greater depth. The homes of a chipmunk, oppossum, raccoon, gray squirrel, owl, and chickadee are superficially described as little bear plays around the tree. At the end of the book, mother bear tells briefly about the home of the polar bear, eagle, and whale. During the "lost-in-the-woods" episode, the homes of the rabbit and turtle are mentioned.

Inez Hogan's black-and-white sketches are lovely and much superior to the written content. The superficiality of the written material may be due to an effort to keep the vocabulary burden low. The print is good and well-placed on each page. Balance of reading matter and illustration is good for early primary grades. Reading level might be first grade for better readers, average reading in second grade, and easy reading in third grade if it were still of interest at that level. *Little Lost Bear* might have some value as supplementary reading for a unit on homes or on animals.

ROSE SABAROFF

Oregon State College

John C. & Elsie F. Caldwell. **Our Neighbors in India.** The John Day Co., 210 Madison Ave., New York 16, N.Y. 48 pages, 1 map, photographs, and section on facts about India for the teacher. Ages 6-9. $2.00.

Our Neighbors in India can best be used as a supplementary text in beginning courses in geography and social studies. The book is well illustrated with photographs and pictures. Its general approach is toward the cultural environment rather than the physical environment. Material is up-to-date giving the young reader an awareness that changes are taking place in the villages of modern-day India.

From the strictly geographical viewpoint the book has many weaknesses because of the use of geographical generalizations. It illustrates that we underestimate the ability of young readers to understand basic geography concepts that can be learned at this age level. There is no attempt to establish geographic relationships—climate, clothing, agriculture, and land forms are all discussed separately. Although the photographs suggest regional differences, the authors do not specifically mention regions. The writers might have divided India, with the aid of maps, into such broad regions as the mountains, plains, plateaus, and coasts, or they might have shown a contrast between northern India and southern India. In spite of these geographical criticisms, the authors have done well in devoting most of the book toward the rural area of India. It cannot be overstated that India is a nation of villages, a fact often passed over lightly. A section on facts specifically for the teacher is included. The vocabulary and pronunciation section should also prove helpful.

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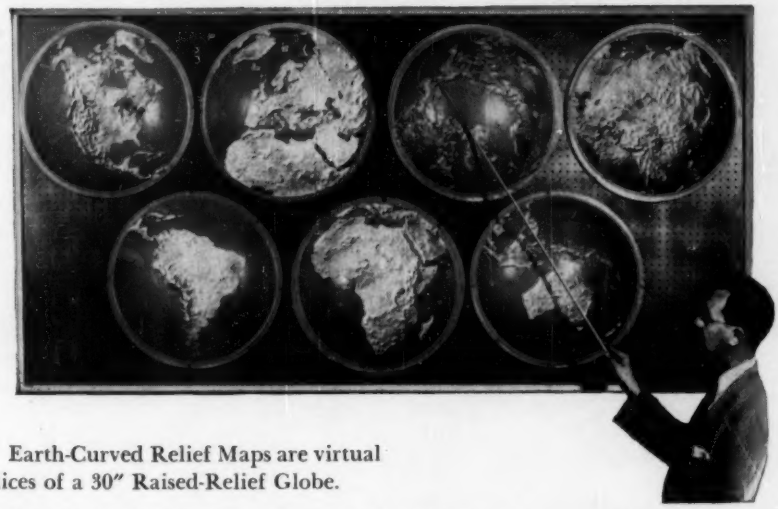

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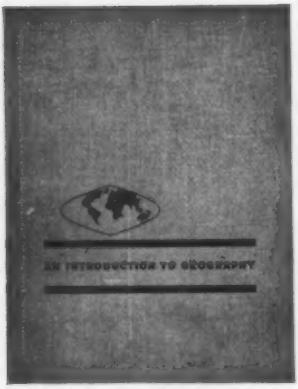

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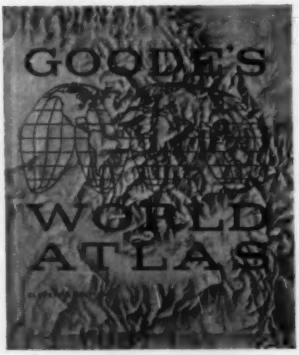

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